

**Total Maximum Daily Loads for Fecal Pathogens
in Buffalo Bayou and Whiteoak Bayou**

Contract No. 582-0-80121

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Final Report

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CHAPTER 1

INTRODUCTION

Microorganisms are always present in terrestrial and aquatic ecosystems. Most types are beneficial, aiding in the synthesis of some chemicals, as essential components of the nitrogen cycle and other biogeochemical cycles, and as food sources for larger animals. However, there is a small subset of microorganisms that is harmful to human health. These disease-causing organisms are known as pathogens (U. S. EPA, 2001).

Over 55% of all stream segments listed on the 2000 303(d) list for Texas are threatened or impaired due to high pathogen concentrations. Bacteria contamination of a water body is an issue of serious concern for water managers. High pathogen concentrations can impair water bodies for uses such as recreational, public water supply, and aquatic life and fishing (U. S. EPA, 2001).

Because of pathogens' small size, they can easily be carried by runoff or other discharges into natural waters. Once in a stream, pathogens can infect humans through water ingestion, skin contact or consumption of contaminated food.

1.1 PROBLEM STATEMENT

Section 303(d) of the Clean Water Act requires that states develop a listing of all stream segments that do not meet surface water quality standards for their designated uses. Surface water quality standards for Texas are defined in 30 Texas Administrative Code, Chapter 307. The two bayous that are the subject of this TMDL Study, Buffalo Bayou and Whiteoak Bayous, are designated for contact recreation.

The State of Texas has recently adopted new standards based upon *Escherichia coli* (*E. coli* or EC) rather than the previously employed fecal coliform indicator bacteria. Fecal coliform is an acceptable indicator until a baseline can be assessed with the *E. coli*. For fecal coliform, no sample should exceed 400 colony-forming units (cfu) per 100 mL for contact recreation. In addition, the geometric mean should be less than 200 cfu/100 mL to meet contact recreation criteria. For *E. coli*, no sample should exceed 394 cfu/ 100 mL and the geometric mean should be less than 126 cfu/100 mL (30 Texas Administrative Code 307.7(b)(A)).

1.2 DESCRIPTION OF THE PROJECT

Description of Study Area

Buffalo Bayou (segments 1013 and 1014) and Whiteoak Bayou (segment 1017) are both included on the 303(d) for pathogens. Buffalo Bayou meanders from the outlying, less-developed portions of Harris County joining Whiteoak Bayou in the highly urbanized central part of the Houston business district. All three segments (1013, 1014 and 1017) lie within the San Jacinto River Basin and eventually discharge to Galveston Bay. Segment 1013, Buffalo Bayou tidal watershed, has a drainage area of 7 square miles and the length of the segment is only 4 miles. Buffalo Bayou above tidal, segment 1014, is shorter in length (4 miles) but has a much larger watershed, a total of 358 square miles. The Whiteoak Bayou watershed has an area of 105 square miles and the stream segment is 23 miles long (H-GAC, 2001).

Scope of the Project

Segments 1013 and 1014 of Buffalo Bayou and Segment 1017 of Whiteoak Bayou in Houston, Texas are among the most fecal contaminated water bodies in Texas as indicated by the frequency and magnitude of exceedances of fecal coliform-based water quality criteria for contact recreation. This project will result in the completion of a Total Maximum Daily Load (TMDL) and load allocation analysis, which will be submitted to TNRCC for approval by the Commission. This total maximum daily load will address violations of water quality criteria for contact recreation in these Houston bayous.

The scope of the TMDL for Fecal Pathogens Project (hereafter called the Bacteria Project) encompasses an assessment of current fecal pathogen levels and trends in Buffalo Bayou and Whiteoak Bayou, an assessment of major sources, and fate and transport of fecal contamination in the environment, assessment of a transport model for the scope area, development of a quality assurance project plan for the project, collection of additional monitoring data, participation and support in stakeholder/public education and developing a total maximum daily load for bacteria in the affected area as well as an assessment of allocation scenarios for the implementation plan. The deliverable from the Bacteria Project is a final report that presents the maximum daily load as well as the various load allocation scenarios.

There are six main tasks in this project as follows:

1. Stakeholder/Public Education and Involvement
2. Assess Current Levels and Trends of Bacterial Indicators of fecal Pathogens in Buffalo Bayou and Whiteoak Bayou

3. Assess Major Sources, Transport and Fate of Bacterial Indicators of Fecal Contamination
4. Apply Models to Elucidate the Sources and Major Processes Controlling Observed Levels of Bacterial Indicators of Bacterial Contamination
5. Develop a quality assurance project plan for additional data collection
6. Bi-Weekly Project Management Meetings

1.3 DESCRIPTION OF THE REPORT

This document constitutes the final report of the TMDL Bacteria Project for Work Order No. 582-0-80121-01 (Contract Number 582-0-80121) and summarizes the activities undertaken by the University of Houston and PBS&J during the period June 26, 2000 to June 30, 2001.

This report compiles the three quarterly reports submitted to TNRCC in compliance with the Work Order and reflects the changes made to respond to stakeholders' and TNRCC's comments. The topics in the report are organized according to the tasks specified in Work Order 582-0-80121-01.

Chapter 2 presents a summary of the reviewed historical indicator bacteria data in Buffalo Bayou and Whiteoak Bayou as well as an analysis of the spatial and temporal trends exhibited by the data.

Chapter 3 contains a summary of the literature pertaining to sources, fate, kinetics and indicators of fecal pathogens in water reviewed for the purposes of this project. An assessment of the sources of fecal coliforms in Buffalo and Whiteoak Bayous is also presented in this chapter.

An analysis of the existing numerical models as well as a description of modeling activities to simulate fecal coliform concentrations in Buffalo and Whiteoak Bayous is presented in Chapter 4 of this report.

Chapter 5 presents a monitoring plan for additional data collection in support of this TMDL and describes the quality assurance program plan for the sampling activities to be conducted starting on July 2001.

Chapter 6 summarizes the support activities conducted by the project team as part of the stakeholder involvement. This chapter includes the presentations given by members of the team at stakeholder meetings and a summary of questions and answers.

Finally, chapter 7 presents the conclusions obtained from the project activities conducted under Work Order No. 1.

1.4 DEFINITIONS

Pathogens: subset of microorganisms that are harmful to living organisms. They can cause diseases or even death when introduced into the body. Pathogens most commonly identified and associated with waterborne diseases are grouped into three general categories: bacteria, protozoans, and viruses (U. S. EPA, 2001). Table 1.1 lists potential waterborne disease-causing organisms and the diseases associated with them.

Indicator Organisms

Because the number of pathogens relative to other microorganisms in water can be very small and difficult to identify, indicator organisms are generally used to measure the quality of the water. The majority of the disease causing organisms found in water are associated with the deposition of human or animal waste in those waters. Consequently, indicator organisms must be easily sampled and measured nonpathogenic bacteria that

are usually associated with pathogens transmitted by fecal contamination so that their presence in water is an evidence of fecal contamination from warm-blooded animals.

Table 1.1 Pathogenic organisms of concern to water quality

Name of organism or group	Major disease	Major reservoirs and primary sources
Bacteria		
<i>Salmonella typhi</i>	Typhoid fever	Human feces
<i>Salmonella paratyphi</i>	Paratyphoid fever	Human feces
Other <i>Salmonella</i>	Salmonellosis	Human and animal feces
<i>Shigella</i>	Bacillary dysentery	Human feces
<i>Vibrio cholerae</i>	Cholera	Human feces
Enteropathogenic <i>E. coli</i>	Gastroenteritis	Human feces
<i>Yersinia enterocolitica</i>	Gastroenteritis	Human and animal feces
<i>Campylobacter jejuni</i>	Gastroenteritis	Human and animal feces
<i>Legionella pneumophila</i> and related bacteria	Acute respiratory illness (legionellosis)	Thermally enriched waters
<i>Mycobacterium tuberculosis</i>	Tuberculosis	Human respiratory exudates
Other (atypical) mycobacteria	Pulmonary illness	Soil and water
Opportunistic bacteria	Variable	Natural waters
Enteric viruses		
Enteroviruses		
Polioviruses	PolioyELITIS	Human feces
Coxsackieviruses A	Aseptic meningitis	Human feces
Coxsackieviruses B	Aseptic meningitis	Human feces
Echoviruses	Aseptic meningitis	Human feces
Other enteroviruses	Encephalitis	Human feces
Reoviruses	Mild upper respiratory and gastrointestinal illness	Human and animal feces
Rotaviruses	Gastroenteritis	Human feces
Adenoviruses	Upper respiratory and gastrointestinal illness	Human feces
Hepatitis A virus	Infectious hepatitis	Human feces
Norwalk and related GI viruses	Gastroenteritis	Human feces
Protozoans		
<i>Acanthamoeba castellani</i>	Amoebic meningoencephalitis	Soil and water
<i>Balantidium coli</i>	Balantidosis (dysentery)	Human feces
<i>Cryptosporidium</i>	Cryptosporidiosis	Human and animal feces
<i>Entamoeba histolytica</i>	Amoebic dysentery	Human feces
<i>Giardia lamblia</i>	Giardiasis (gastroenteritis)	Human and animal feces
<i>Naegleria fowleri</i>	Primary amoebic meningoencephalitis	Soil and water

Source: (American Water Works Association, 1990)

For a microorganism (or group of microorganisms) to be an indicator organism, it should (AWWA, 1990): (i) be always present when the pathogen of concern is present,

and absent in uncontaminated water; (ii) be present in large numbers in fecal matter; (iii) have a response to environmental conditions that is similar to that of the pathogens of concern; (iv) be easy to isolate, identify, and enumerate; (v) be present in much larger numbers than the pathogen of interest; (vi) should come from the same source than the pathogens do.

A number of microorganisms have been evaluated as indicator organisms, including total coliforms, fecal coliforms, *E. coli*, fecal streptococci, enterococci, Heterothrophic plate count (HPC), *Pseudomonas aeruginosa*, and yeast.

Total Coliforms

This group of organisms is defined as all the aerobic and facultatively anaerobic, gram-negative, non-spore-forming, rod-shaped bacteria that are able to ferment lactose with gas formation (AWWA, 1990).

Fecal Coliforms

Fecal coliforms are a subset of total coliforms, which includes several species of coliform bacteria that are present in the intestines and feces of warm-blooded animals (U. S. EPA, 2001).

***Escherichia coli* (*E. coli*)**

A subgroup of the fecal coliform bacteria. *E. coli* is part of the normal intestinal flora in humans and animals and is, therefore, a direct indicator of fecal contamination in a waterbody. The O157 strain, sometimes transmitted in contaminated waterbodies, can cause serious infection resulting in gastroenteritis (U. S. EPA, 2001).

Water Uses

Section 303(c) of the Clean Water Act lists the designated uses of a specific water body. These uses include recreation, domestic water supply, and aquatic life.

Recreational use consists of two categories: contact recreation and noncontact recreation waters. A segment is designated for contact recreation unless elevated concentrations of indicator bacteria occur due to sources of pollution that can not be reasonably controlled by existing regulations or contact recreation is considered unsafe for other reasons such as ship traffic (TNRCC, 2000). Table 1.2 includes the numerical criteria for fecal pathogens in recreational waters in Texas.

Domestic water supplies consist of two use categories: public water supply and aquifer protection. Segments designated for public water supply include those known to be used or have potential to be used as the supply source for public water systems. On the other hand, segments designated for aquifer protection are those that infiltrate into and recharge an aquifer. Table 1.2 shows the Texas standards for fecal pathogens in domestic water supplies.

Finally, a segment is designated aquatic life use when fish, shellfish, oyster, and mussels inhabiting the water body are fished to be consumed by humans. Table 1.2 includes the Texas numerical criteria for fecal pathogens in waters designated for aquatic use.

Table 1.2 Texas Standards for Fecal Pathogens

TYPE OF WATER	LIMIT
Recreation *	
<i>Freshwater</i>	
Contact	The geometric mean of <i>Escherichia coli</i> must be less than 126 colony forming units (cfu)/100 mL. A single sample should never exceed 394 cfu / 100 mL.
Noncontact	The geometric mean of <i>E. coli</i> must be less than 605 cfu / 100 mL.
<i>Salt Water</i>	
Contact	The geometric mean of <i>Enterococci</i> must be less than 35 cfu / 100 mL. A single <i>Enterococci</i> sample should never exceed 89 cfu / 100 mL.
Noncontact	The geometric mean of <i>Enterococci</i> must be less than 168 cfu / 100 mL.
Domestic Water Supply	
Public Water Supply	<p>For public water supplies collecting less than 40 bacteriological samples per month (cities less than 41,000), must have less than the MCL of 5.0% positive total coliform samples.</p> <p>For systems collecting more than 40 bacteriological samples per month, the MCL is one positive total coliform sample per month.</p> <p>**</p>
Aquatic Life	There are five designations: limited, intermediate, high, and exceptional aquatic life and oyster waters. Of these designations, only oyster waters have a specific pathogen requirement. Pathogen requirements for the other designations are applied in a site-specific manner according to the 30 TAC §307.10. Appendices A. In general, the contact and non-contact recreation limits are applied. *
Oyster Water	The median fecal coliform concentration must not be above 14 cfu / 100 mL, with no more than 10% of all samples exceeding 43 cfu / 100 mL. .

* 30 Texas Administrative Code (TAC) ' 307.7(b)

**30 TAC ' 290.109

CHAPTER 2

ASSESSMENT OF CURRENT LEVELS AND TRENDS OF BACTERIA DATA IN BUFFALO AND WHITEOAK BAYOUS

2.1 REVIEW OF HISTORICAL INDICATOR BACTERIA DATA

This section describes the analysis of historical monitoring data performed as a component of the total maximum daily load (TMDL) study for fecal coliform (FC) for Buffalo Bayou and Whiteoak Bayou. The analysis focused on data collected by four major sources – the Texas Natural Resource Conservation Commission (TNRCC), the U. S. Geological Survey (USGS), the City of Houston Health and Human Services Department (H&HS), and the City of Houston Public Works and Engineering Department (PW&E). Other bacteria data have probably been collected in these bayous. However, the four listed agencies are the major sources that have performed continuous monitoring of the bayous.

An evaluation was first conducted to determine if there is any significant difference between data collected by the different agencies. This evaluation is important in deciding whether the data could be combined for analysis or they should be treated separately. Then the data were analyzed for temporal trends and spatial patterns. Analyses were also performed on the effect of flow. While the main emphasis was on bacteria data, other water quality parameters were tabulated.

2.1.1 Data Compilation

A total of five sets of FC bacteria data were obtained. Two of these five sets were downloaded from the web site of the Houston-Galveston Area Council (H-GAC). One of the H-GAC data sets is described as San Jacinto River Basin data. This is TNRCC and USGS data from 1992 through 1999. The other set is described as local monitoring data. The period for the local data is 1997 through 1999. The third set of data was downloaded from the TNRCC web site and consists of data from 1993 to 1999 from all sources.

In addition, the H&HS had supplied their bayou monitoring data from 1995 to 1998 to H-GAC. The H-GAC then made these data available to the project. The last set of data is PW&E data from 1983 to 1996 compiled by PBS&J in a previous study supplemented with 1997 data retrieved during this project.

As would be expected, there are overlaps of records among these five data sets. The duplicates were first identified and removed and the data were sorted according to the source agency, i.e. TNRCC, USGS, H&HS and PW&E. Figure 2.1 shows the locations of the sampling stations. It is noted that there are more TNRCC sampling stations in the two watersheds than those shown in Figure 2.1. Some are upstream of Barker Dam. However, the figure only shows stations with FC data in the databases described above.

The data collected from tributaries of the two bayous are mainly from H&HS. Therefore, when performing the comparison of data sources, only data from the main stems were considered.

The compiled database can be found in Appendix A of this report (electronic version). Table A.1 in Appendix A summarizes the data. It can be seen in Figure 2.1 that

data were collected from 20 locations in the Buffalo Bayou and from 17 locations in Whiteoak Bayou. Fecal coliform concentrations in Buffalo Bayou range between 1 and 250,000 cfu/100 mL, with geometric means between 607 and 9,374 cfu/100 mL. On the other hand, concentrations in Whiteoak Bayou are within the range 9-1,000,000 cfu/100 mL and the geometric means vary between 4 and 11,387 cfu/100 mL. In general, Whiteoak Bayou is more contaminated than Buffalo Bayou as indicated by an average geometric mean of fecal coliform concentration of 3,701 cfu/mL compared to 2,568 cfu/100 mL for Buffalo Bayou.

2.1.2 Flow Conditions

Because runoff can carry high FC levels from non-point sources, flow conditions under which samples were collected were considered in the comparison between data sets. There are three USGS flow gages on Buffalo Bayou with relatively complete flow records. These gages are located at Dairy Ashford Road (USGS Station 08073500), West Belt Drive (USGS Station 08073600) and Piney Point Road (USGS Station 08073700). The gages are not located far apart and their flow records have essentially the same flow patterns. The record at West Belt Drive was used since it is complete for the period that bacteria data are available. There are two USGS gages on Whiteoak Bayou, one at Alabonson Road (USGS Station 08074020) and the other at Heights Blvd (USGS Station 08074500). The gage at Alabonson Road appears to be defective since its record shows a consistent base flow of about 400 cfs. Therefore the record at Heights Blvd was used. This record is also complete for the period that bacteria data are available. The gages are shown in Figure 2.1.

Figures 2.2 and 2.3 show the cumulative flow frequency curves for Buffalo Bayou at West Belt and Whiteoak Bayou at Heights Blvd respectively. In each figure, the curve for the complete period of bacteria data (1983 to 1999) and the curves for the earlier half and latter half of the period are shown. The flow regime for Whiteoak Bayou appears to be the same for the whole period whereas some changes appear to have occurred in the flow regime for Buffalo Bayou at higher flows.

To facilitate data analysis, flow screening levels were defined for each bayou. Screening levels selected for Buffalo Bayou are 100 cfs and 1000 cfs and those for Whiteoak Bayou are 50 cfs and 300 cfs. It can be seen from Figures 2.2 and 2.3 that for each bayou, the lower screening level corresponds to approximately the median of the flow data and the higher level corresponds to approximately the 90th percentile of non-exceedance.

Table 2.1 shows the percentages of FC data remaining after data sampled at flows above the selected values have been screened out. The percentages of data remaining after screening are shown for the whole period of data record for the various collection agencies as well as for the recent period starting from 1995. The year 1995 was chosen because the H&HS data set starts from 1995.

The USGS has contributed a relatively small amount of data, a total of only 45 samples for the two bayous. Over half of the samples were collected before 1995 and appear to be predominantly wet weather samples. The percentages of H&HS data remaining after screening match roughly with the percentiles of the flow screening levels. This observation indicates that the H&HS sampling program followed a regular pattern and that weather conditions were not a consideration in the decision to sample. On the

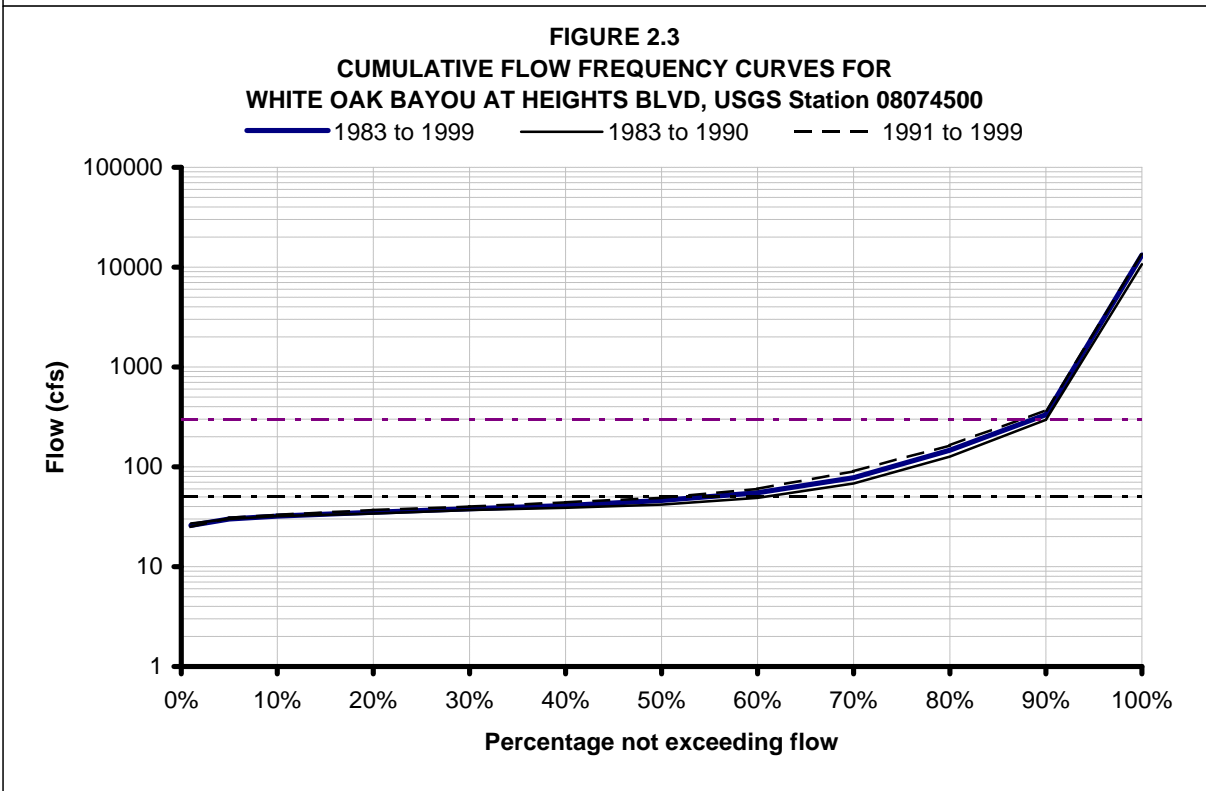
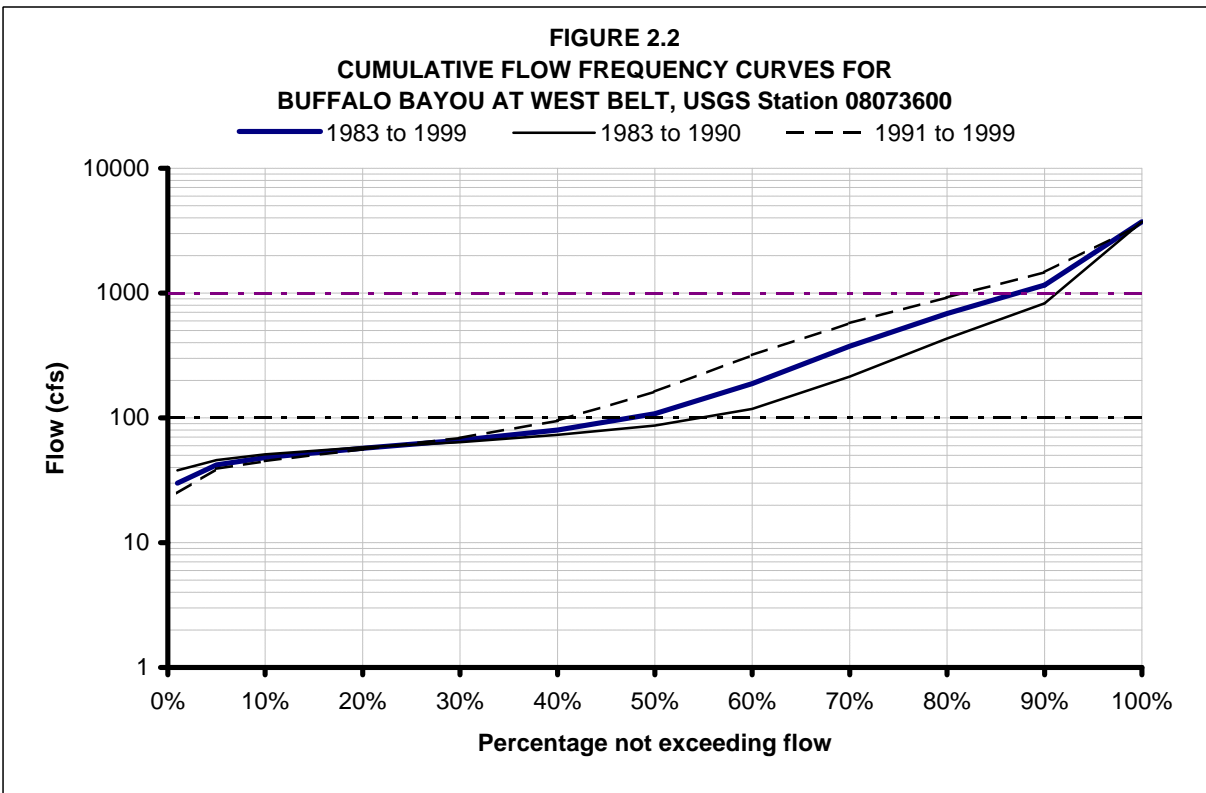


TABLE 2.1
PERCENTAGES OF FC DATA COLLECTED UNDER DIFFERENT FLOW CONDITIONS

	All data					Data since 1995				
	PW&E	H&HS	USGS	TNRCC	TOTAL	PW&E	H&HS	USGS	TNRCC	TOTAL
Buffalo Bayou										
Period of data	'83-'99	'95-'99	'93-'98	'92-'99	83-'99	'95-'99	'95-'99	'95-'98	'95-'99	'95-'99
Total number of samples	2655	770	24	84	3533	990	770	6	51	1817
Data with flow < 1000 cfs	91.1%	87.1%	91.7%	84.5%	90.1%	92.0%	87.1%	100.0%	92.2%	90.0%
Data with flow < 100 cfs	54.5%	48.6%	12.5%	57.1%	53.0%	63.3%	48.6%	50.0%	82.4%	57.6%
White Oak Bayou										
Period of data	'88-'99	'95-'99	'92-'98	'92-'99	'88-'99	'95-'99	'95-'99	'95-'98	'95-'99	'95-'99
Total number of samples	1143	151	21	51	1366	436	151	12	30	629
Data with flow < 300 cfs	94.8%	90.7%	85.7%	86.3%	93.9%	94.7%	90.7%	75.0%	96.7%	93.5%
Data with flow < 50 cfs	59.9%	53.0%	38.1%	60.8%	58.9%	68.3%	53.0%	50.0%	73.3%	64.5%

USGS gauges:

08073600 Buffalo Bayou at West Belt

08074500 White Oak Bayou at Heights Blvd

other hand, all the PW&E and TNRCC data in the more recent period (1995 to 1999) appear to be geared toward dry weather sampling. For example, the TNRCC data from '92-'99 has a markedly lower percentage of data collected below the median flow than the data from '95-'99. It appears that there has been a greater emphasis by TNRCC on dry weather sampling of bacteria levels in recent years, while PW&E has maintained this emphasis in all its monitoring.

2.1.3 Statistical Tests

Table 2.2 shows the number of samples at each station. The stations with a significant amount of data from more than one collection agency were identified and are highlighted in Figure 2.1. Statistical tests for comparing means and variances between data sets collected by different agencies were performed and the results are listed in Table 2.3. In a few cases, data from two nearby stations were used for the tests if there were no large data sets to compare at exactly the same station.

The tests were performed on the geometric means of the data, i.e. comparison was made using the mean of the log data and the variance of the log data. For the statistical tests the null hypothesis is that there is no significant difference between the means or the variances of the log data. The level of confidence selected was 95%. The 1997 PW&E data were not available at the time of the tests, therefore, whenever the PW&E data were involved, the comparison was made separately for pre-1997 data and post-1997 data.

For the Whiteoak Bayou data in Table 2.3, the null hypotheses of equal mean and equal variance are accepted in all tests for data collected at low flow. For the Buffalo Bayou data, the null hypotheses are accepted in most of the tests for data collected at low flow. However, including data collected at higher flow in the right portion of the table

TABLE 2.2
NUMBER OF SAMPLES AT EACH SAMPLING STATION

Station ID	Location (from upstream to downstream)	Total number of samples	Number of samples from individual agency				Start date				End date			
			TNRCC	USGS	H&HS	PW&E	TNRCC	USGS	H&HS	PW&E	TNRCC	USGS	H&HS	PW&E
11142	Barker Dam	269			132	137			01/04/95	07/21/87			12/31/98	12/05/96
11364	SH 6	198			30	168			02/01/99	02/24/86			06/29/99	09/27/99
11363	Eldridge Rd	71				71				04/26/94				09/27/99
11362	Dairy Ashford Rd	229	33			196	02/06/92			01/19/83	05/05/99			09/27/99
B 11361	Wilcrest Dr	71				71				03/23/83				09/27/99
U 11360	West Belt	349		2	152	195		08/03/98	01/04/95	01/19/83		08/22/98	06/29/99	09/27/99
F 11359	Gessner Dr	159				159				03/23/83				09/27/99
F 15846	Briar Forest Ave	181				181				02/28/85				09/27/99
A 11358	Piney Point Rd	11	11				02/08/94				08/06/96			
L 11357	San Felipe St	186				186				01/19/83				09/27/99
O 11356	Voss Rd	154			154				01/04/95				06/29/99	
	15845 Chimney Rock Rd	168				168				04/11/83				09/27/99
B 11354	Woodway Dr	191	4			187	11/19/92			03/23/83	08/16/93			09/27/99
A 11353	IH 610	123				123				03/06/89				09/27/99
Y 15844	Westcott Ave	124				124				01/19/83				12/16/98
O 11351	Shepherd Dr	451	3	20	153	275	02/24/92	05/05/93	01/04/95	01/19/83	08/03/92	08/22/98	06/29/99	09/27/99
U 15843	Sabine Ave	199				199				01/19/83				09/27/99
	11347 Main St	149			149				01/04/95				06/29/99	
	15842 San Jacinto Ave	98				98				10/11/83				09/27/96
	11345 McKee St	152	33	2		117	02/24/92	08/03/98		01/19/83	08/03/99	08/22/98		09/27/99
	15841 Jensen Dr	163				163				01/19/93				11/03/97
	15840 Turning Basin	115				115				01/19/93				11/03/97
	Total	3533	84	24	770	2655								
	11398 Jones Rd	17	17				02/06/92				08/07/96			
W 15831	W. Tidwell Ave	95				95				12/20/89				09/15/99
H 15830	Watonga	96				96				12/20/89				09/15/99
I 15829	W. 43rd St	86				86				12/20/89				09/02/98
T 16637	W. T C Jester Ave (nr W. 34th St)	10				10				02/13/98				09/15/99
E 11390	W. 34th St	96				96				12/20/89				09/15/99
	11391 Ella Blvd	91				91				12/20/89				09/15/99
O 15828	W. T C Jester Ave (nr W. 12th St)	71				71				12/20/89				05/07/97
A 15827	N. Durham St	101				101				12/20/89				12/05/96
K 11387	Heights Blvd	203	31	21	151		11/19/92	02/26/92	02/03/95		08/03/99	08/11/98	06/29/99	
	15826 Studemont Ave	111				111				12/20/89				09/21/99
B 11388	Houston Ave	3	3				02/24/92				08/03/92			
A 11385	Wrightwood St	79				79				08/07/90				05/07/97
Y 15825	Crocket Ave	77				77				12/20/89				09/15/99
O 15824	Girard Ave	210				210				07/07/88				11/03/97
U 16647	S. Pacific RR Crossing	17				17				02/04/98				09/15/99
	16646 Confluence with Buffalo Bayou	3				3				02/13/98				09/02/98
	Total	1366	51	21	151	1143								

TABLE 2.3
STATISTICAL COMPARISON OF MEANS AND VARIANCES BETWEEN DATA SETS COLLECTED BY DIFFERENT AGENCIES

Station	Source of data		Flow < 100 cfs for Buffalo Bayou or flow < 50 cfs for White Oak Bayou									Flow < 1000 cfs for Buffalo Bayou or flow < 300 cfs for White Oak Bayou								
			Period	Number of samples		Data set 1		Data set 2		Null hypothesis		Period	Number of samples		Data set 1		Data set 2		Null hypothesis	
	Geom Mean	Stdev (log)				Geom Mean	Stdev (log)	Same mean	Same variance	Geom Mean	Stdev (log)				Geom Mean	Stdev (log)	Same mean	Same variance		
				1	2								1	2					1	2
BU 11142	H&HS	PW&E	05/95 - 12/96	36	11	345	0.42	2,138	0.93	Reject	Reject	01/95 - 12/96	61	19	792	0.78	1,547	0.84	Accept	Accept
BU 11362	TNRCC	PW&E	07/93 - 12/96	9	35	1,410	0.69	1,698	0.63	Accept	Accept	05/92 - 12/96	16	55	1,671	0.81	1,542	0.60	Accept	Accept
BU 11362	TNRCC	PW&E	02/98 - 09/99	8	13	640	0.39	1,072	0.69	Accept	Accept	02/98 - 09/99	9	16	686	0.38	1,509	0.72	* (Note 7)	Reject
BU 11360	H&HS	PW&E	01/95 - 12/96	35	19	2,001	0.75	2,249	0.65	Accept	Accept	01/95 - 12/96	57	29	2,833	0.81	1,698	0.76	Accept	Accept
BU 11360	H&HS	PW&E	02/98 - 09/99	30	13	2,745	0.66	1,153	0.33	Reject	Reject	01/98 - 09/99	46	16	3,709	0.69	1,632	0.50	Reject	Accept
BU 11356 & 11357	H&HS	PW&E	02/95 - 12/96	37	21	1,681	0.68	1,558	0.52	Accept	Accept	01/95 - 12/96	60	30	2,974	0.80	1,830	0.56	Accept	Reject
BU 11356 & 11357	H&HS	PW&E	02/98 - 09/99	28	13	2,514	0.70	816	0.54	Reject	Accept	01/98 - 09/99	43	16	3,312	0.73	1,254	0.64	Reject	Accept
BU 11351	H&HS	PW&E	02/95 - 12/96	40	36	3,928	0.70	2,869	0.63	Accept	Accept	01/95 - 12/96	62	51	5,014	0.69	2,617	0.63	Reject	Accept
BU 11351	H&HS	PW&E	02/98 - 06/99	25	24	3,845	0.56	2,191	0.70	Accept	Accept	01/98 - 06/99	39	31	4,244	0.56	1,974	0.70	Reject	Accept
BU 11347 & 15843	H&HS	PW&E	02/95 - 12/96	38	22	5,416	0.59	3,624	0.58	Accept	Accept	01/95 - 12/96	61	32	9,176	0.67	3,418	0.57	Reject	Accept
BU 11347 & 15843	H&HS	PW&E	02/98 - 09/99	23	13	3,760	0.56	3,718	0.74	Accept	Accept	01/98 - 09/99	36	16	4,642	0.53	4,295	0.72	Accept	Accept
BU 11345	TNRCC	PW&E	06/93 - 12/96	9	43	7,164	0.63	3,035	0.68	Accept	Accept	06/92 - 12/96	16	64	11,411	0.57	3,338	0.62	Reject	Accept
BU 11345	TNRCC	PW&E	03/98 - 09/99	9	12	1,271	0.71	3,004	0.78	Accept	Accept	02/98 - 09/99	10	15	1,316	0.67	4,279	0.79	Accept	Accept
WO 11387 & 15826	H&HS	PW&E	02/95 - 12/96	26	15	4,718	0.67	6,067	0.66	Accept	Accept	02/95 - 12/96	38	22	6,188	0.71	6,521	0.77	Accept	Accept
WO 11387 & 15826	H&HS	PW&E	01/98 - 09/99	31	17	4,781	0.51	3,422	0.57	Accept	Accept	01/98 - 09/99	50	25	5,606	0.62	2,842	0.57	Reject	Accept
WO 11387 & 15826	TNRCC	USGS	02/93 - 11/98	17	8	3,992	0.67	1,842	0.41	Accept	Accept	02/93 - 11/98	25	15	6,578	0.68	2,617	0.36	Reject	Reject
WO 11387 & 15826	H&HS	TNRCC	02/95 - 08/99	80	16	3,925	0.60	3,406	0.71	Accept	Accept	02/95 - 08/99	137	22	5,164	0.64	5,568	0.73	Accept	Accept
WO 11387 & 15826	H&HS	USGS	02/95 - 08/98	70	6	3,996	0.63	2,040	0.43	Accept	Accept	02/95 - 08/98	119	9	5,345	0.66	2,399	0.39	Reject	Accept

Notes:

- When comparing means, the null hypothesis is that the means of the two data sets are equal. When comparing variances, the null hypothesis is that the variances of the two data sets are equal.
- Null hypothesis is tested at the 95% confidence level.
- Reference: Statistical Analysis for Engineers by J. Wesley Barnes, 1988.
- A general assumption is that the data are log normally distributed. However, when the total number of data of the two data sets minus two is greater than 30, the normality assumption is not necessary for tests comparing two means (Barnes, 1988).
- When the total number of data of the two data sets minus two is less than 30, the test comparing two means requires the assumption of equal variance, a pooled estimate of the variance of the two data sets combined and the t-distribution are used; otherwise, estimate for the standard deviation of each data set is made and the normal distribution is used.
- The test for equal variance employs the F-statistic.
- * In this case, the test requires equal variance. Since the null hypothesis for equal variance is rejected, the test comparing means is not performed.
- Locations of stations:

11142	Buffalo Bayou at Barker Dam
11362	Buffalo Bayou at Dairy Ashford Road
11360	Buffalo Bayou at West Belt
11357	Buffalo Bayou at San Felipe Street
11356	Buffalo Bayou at Voss Road
11351	Buffalo Bayou Tidal at Shepherd Drive
15843	Buffalo Bayou Tidal at Sabine Avenue
11347	Buffalo Bayou Tidal at Main Street
11345	Buffalo Bayou Tidal at Mckee Street
11387	White Oak Bayou at Heights Blvd
15826	White Oak Bayou at Studemont Avenue

9. USGS gauges:

08073600	Buffalo Bayou at West Belt
08074500	White Oak Bayou at Heights Blvd

causes rejection of the null hypothesis in many more cases. This observation is apparently related to the above discussion that the collection agencies have different sampling strategies with respect to weather conditions. This result also reflects the nature of wet weather samples where higher variability can be expected.

2.1.4 Data Comparison Conclusions

If data obtained under all flow conditions are included in the analysis, there appears to be significant differences between data sets. Considering data collected at flows less than the 90th percentile which eliminates the largest flow events, the null hypothesis is rejected in 9 out of 17 data set comparisons for the means. For low flow data (i.e. days where the daily average flow at selected gages was below the median value), there does not appear to be statistically significant differences between data sets collected by different agencies. There are a few cases where the null hypotheses of equal mean and/or equal variance have been rejected. Nevertheless, such apparent differences might well be caused by the inherently high variability of bacteria data and the fact that a relatively small amount of data is being considered.

Based on this analysis, it would appear that data from all agencies could be grouped so long as the data are first screened to eliminate data at higher flow where runoff is more likely to be a factor. Even then care will need to be taken to assure proper comparisons because at least one agency, the TNRCC, appears to have changed monitoring strategies in recent years.

2.1.5 Data on other Conventional Water Quality Parameters

To give a general characterization of the water quality in the two bayous, Table 2.4 lists the statistics of selected conventional parameters at a downstream station of each bayou. These two stations have been more frequently sampled and the parameters listed are those with larger amount of data. The mean values of the parameters appear to be within typical ranges.

A few points are worth noting in the data for the two bayous. The first is that the Buffalo Bayou conductivity is markedly lower than that for Whiteoak Bayou. The difference in dissolved oxygen is substantial probably reflecting the physical differences, with Buffalo being a natural channel and Whiteoak being concrete lined in this reach. The difference between the BOD and CBOD data in Buffalo Bayou is roughly what would be expected. The overall BOD levels are influenced by the 4 mg/L reporting limit for the H&HS data. Many of these values were “<” results. The differences in TSS results, with Buffalo over twice as high as Whiteoak, may also reflect the differences in the channel bottom. Both bayous have low ammonia-N levels reflecting an overall high level of wastewater treatment.

2.2 TEMPORAL TRENDS AND SPATIAL PATTERNS

This section analyzes the data obtained at lower flows to evaluate temporal trends and spatial patterns.

TABLE 2.4
SELECTED PARAMETERS IN BUFFALO AND WHITE OAK BAYOUS

Parameter	Unit	Number of data	Start date of data	End date of data	Mean	Standard Deviation
Station 11351, Buffalo Bayou at Shepherd Dr, River Km 7.0						
Conductivity	µmhos/cm	149	09/04/83	06/29/99	522	444
Dissolved Oxygen	mg/L	443	01/19/83	09/27/99	6.50	1.57
BOD ₅ ¹	mg/L	186	07/30/85	09/27/99	4.36	1.66
CBOD ₅	mg/L	169	01/19/83	02/15/99	3.55	2.74
TSS	mg/L	245	07/30/85	06/29/99	84.6	104.9
NH ₃ -N	mg/L	342	01/19/83	09/27/99	0.29	0.53
SO ₄	mg/L	173	02/24/92	06/29/99	20.3	11.6
Station 11387, White Oak Bayou at Heights Blvd, River Km 5.2						
Conductivity	µmhos/cm	165	11/19/92	11/09/99	678	252
Dissolved Oxygen	mg/L	234	02/26/92	11/09/99	12.41	3.50
BOD ₅ ¹	mg/L	184	02/26/92	06/29/99	4.69	4.42
TSS	mg/L	232	02/26/92	08/03/99	38.1	83.3
NH ₃ -N ²	mg/L	187	02/26/92	08/03/99	0.27	0.39
SO ₄ ²	mg/L	232	02/26/92	08/03/99	32.2	29.3

¹ H&HS, which has contributed significantly to this data set, has a detection limit of 4 mg/L for BOD₅

² Two samples on 3/3/97 have unusually high values of NH₃-N (> 40 mg/L) and SO₄ (> 600 mg/L). These high values are excluded.

³ There are no data for CBOD₅ at Station 11387.

2.2.1 Temporal Trends

Figures 2.4 and 2.5 show time series plots of FC data for each station on Buffalo Bayou and Whiteoak Bayou respectively. The data shown are samples from all agencies collected at low flow, i.e. below 100 cfs for Buffalo Bayou and below 50 cfs for Whiteoak Bayou. As mentioned in Section 2.1, the reference USGS flow gages are the gage at West Belt for Buffalo Bayou and the gage at Heights Blvd for Whiteoak Bayou. On the plots, different symbols are used to distinguish between samples collected by different agencies. For the tributaries, the data of all except two of the stations are from 1997 to 1999. Since tributary data are generally available only for a few recent years, the analysis of temporal trends was focused on the main stems.

In general, there do not appear to be significant data gaps in the plots. As is common in water quality data and especially for data sets that are combinations of data collected from different monitoring programs, the density of data varies somewhat throughout the period of record. Some of the data were obtained from monitoring programs that roughly sampled once a month while some data are 5-times-in-30-days samples. Moreover, some stations have been sampled more often than others. There are some stations with very few samples.

Trend Analysis for 1992-1999 Data

At a number of stations on both Buffalo Bayou and Whiteoak Bayou, some of the PW&E data from late 1980s to 1991 have very low values. There are also high FC values during the same period. The low FC values are likely due to high chlorine residuals in

FIGURE 2.4
TIME SERIES OF BUFFALO BAYOU FC DATA AT FLOW < 100 CFS
 ○ H&HS × PW&E ■ TNRCC ◆ USGS

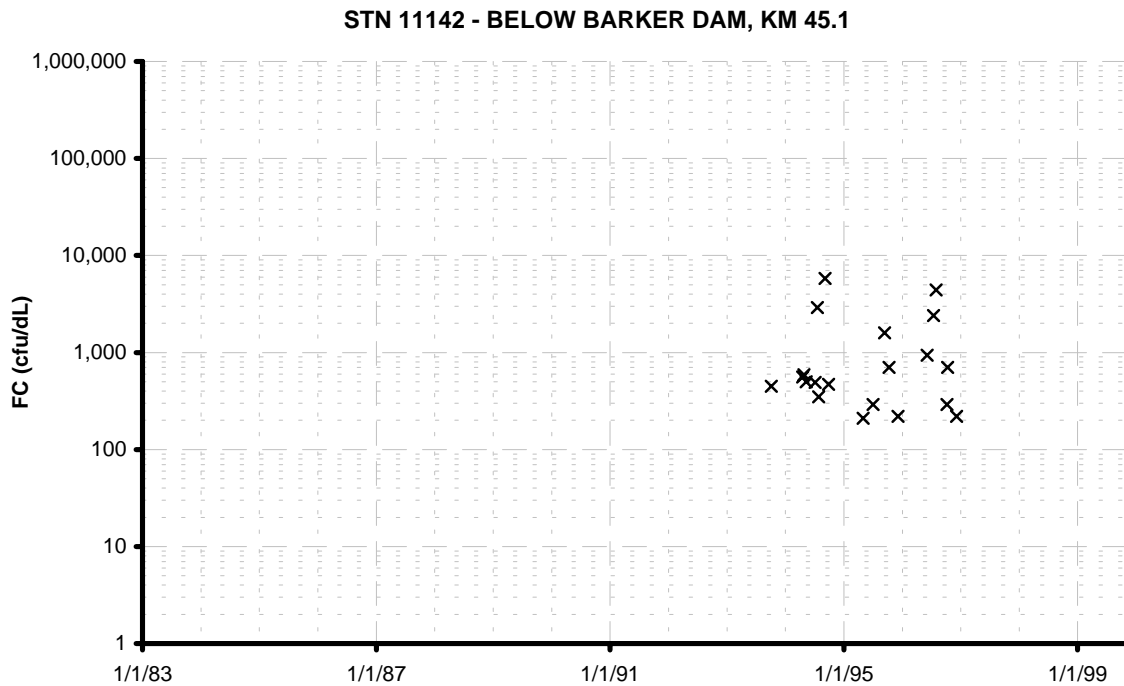
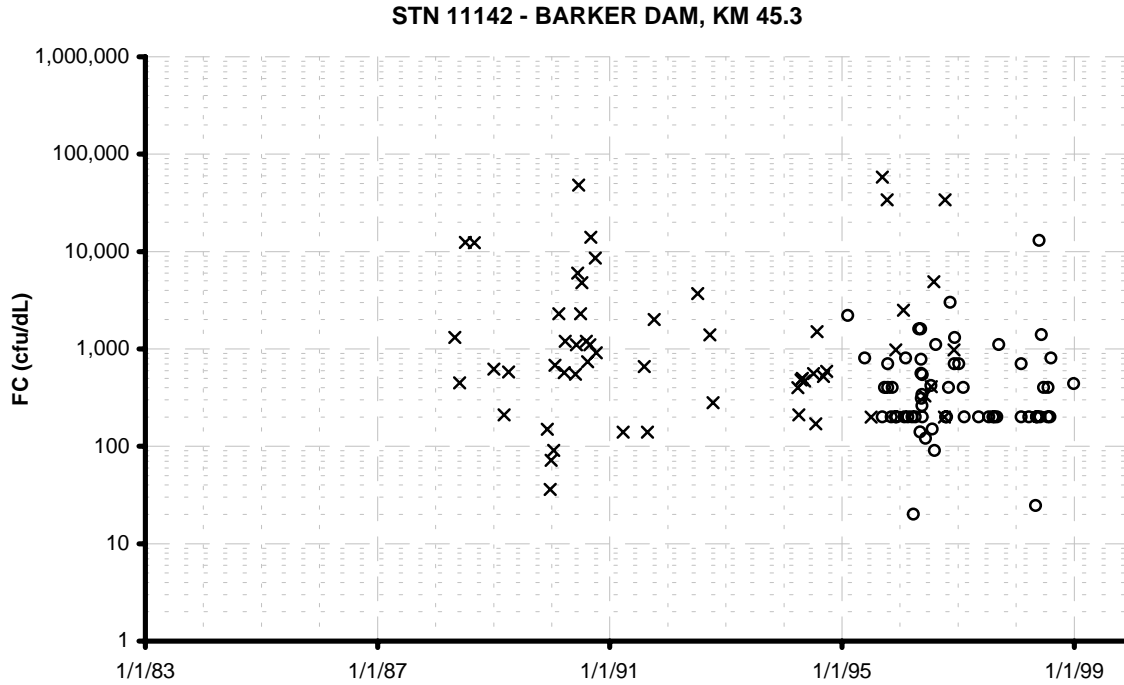


FIGURE 2.4 (CONTINUED)
TIME SERIES OF BUFFALO BAYOU FC DATA AT FLOW < 100 CFS
 ○ H&HS × PW&E ■ TNRCC ◆ USGS

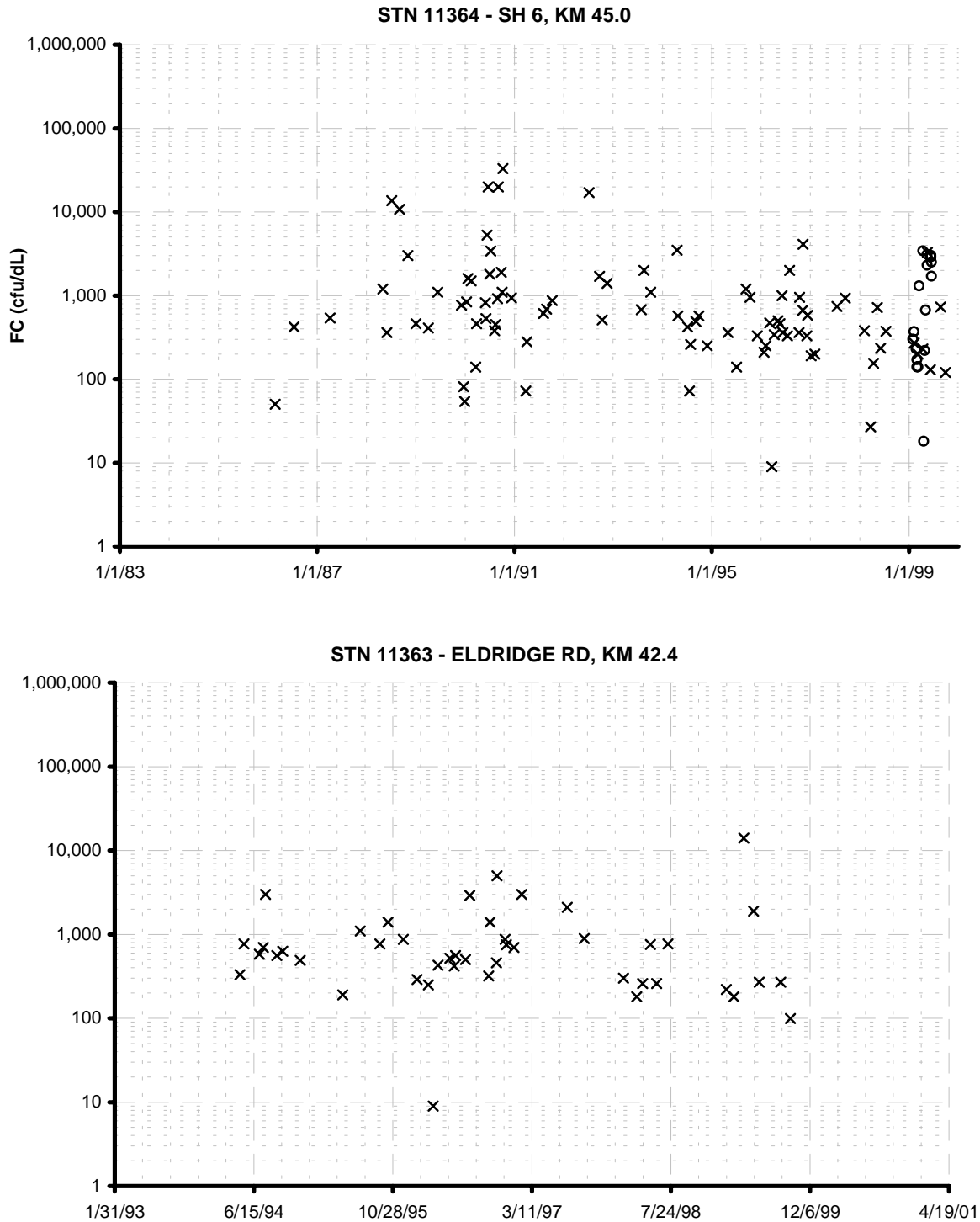


FIGURE 2.4 (CONTINUED)
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 ○ H&HS × PW&E ■ TNRCC ◆ USGS

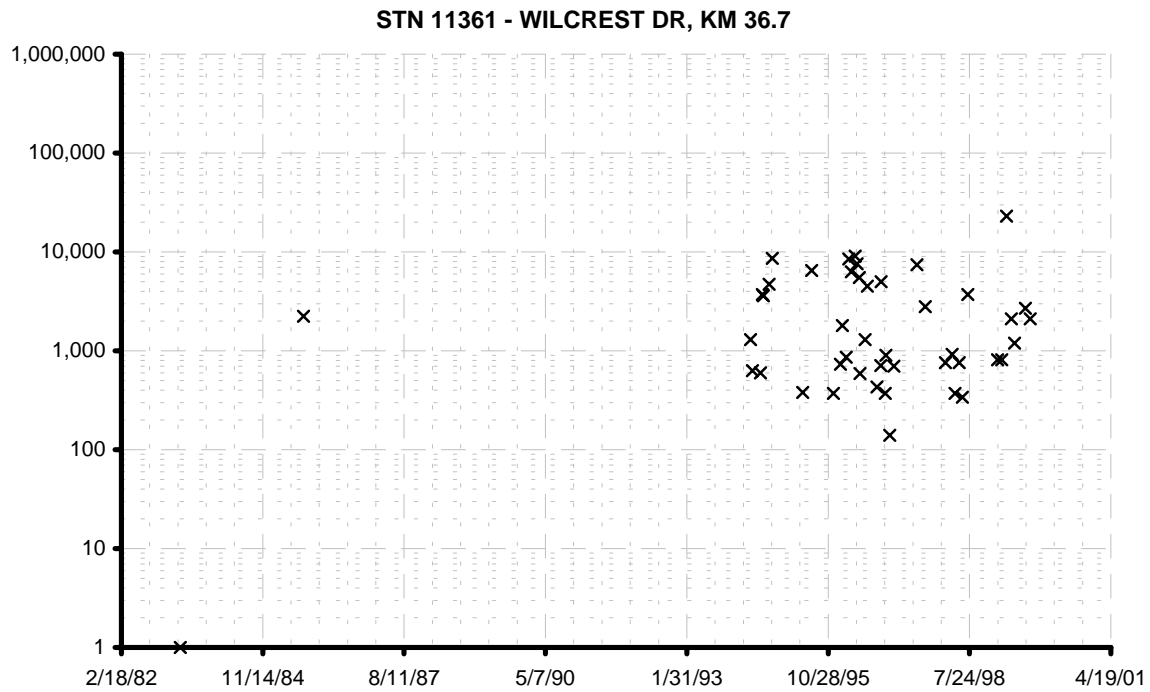
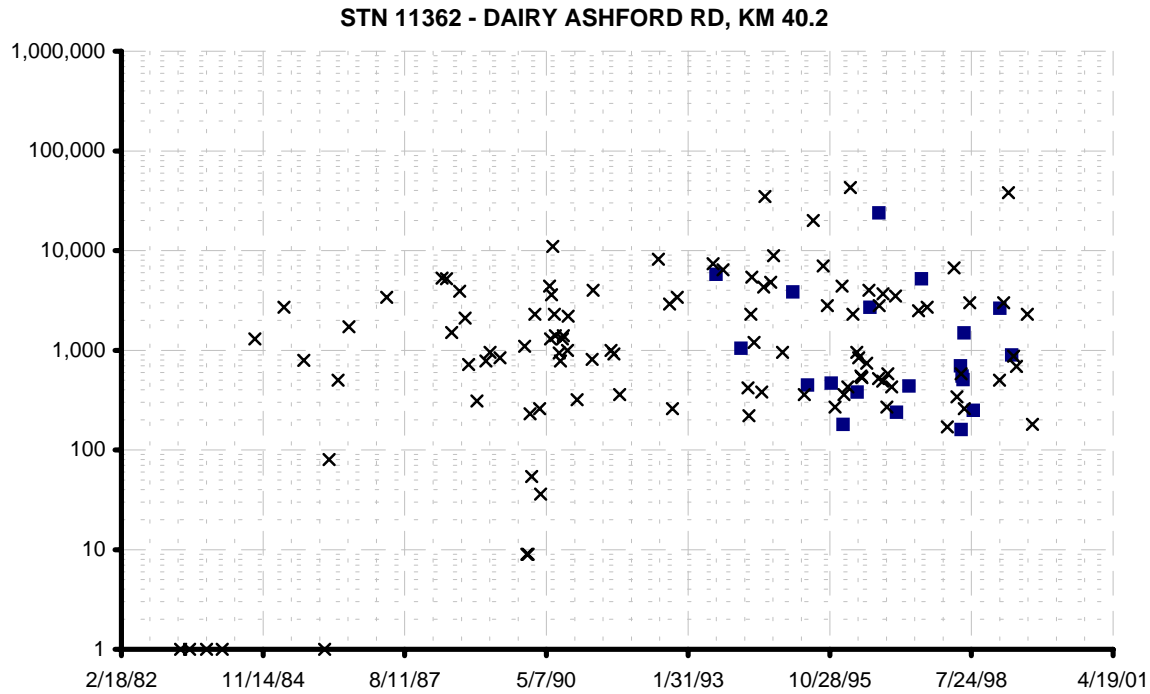


FIGURE 2.4 (CONTINUED)
TIME SERIES OF BUFFALO BAYOU FC DATA AT FLOW < 100 CFS
 ○ H&HS × PW&E ■ TNRCC ◆ USGS

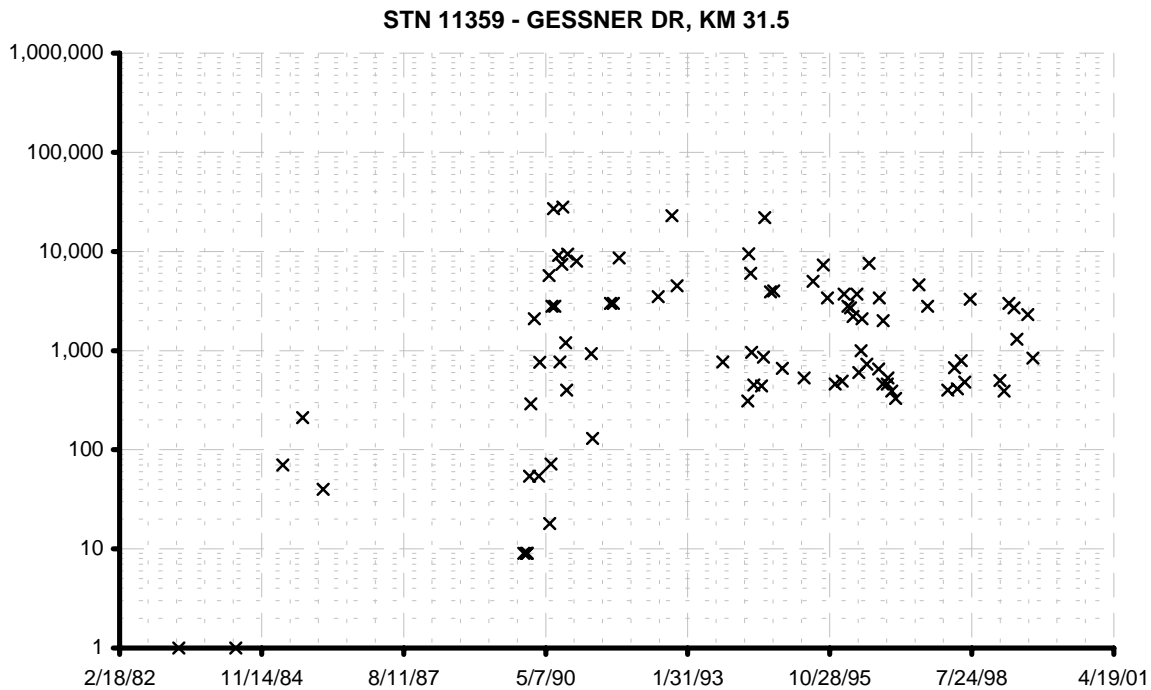
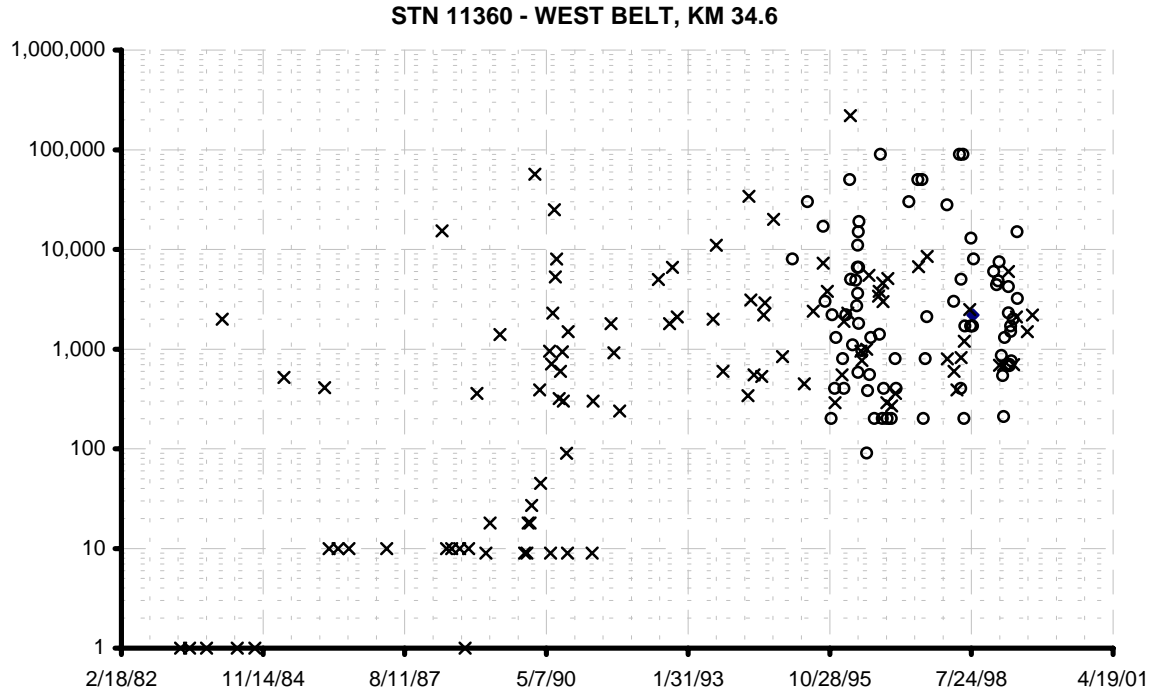


FIGURE 2.4 (CONTINUED)
TIME SERIES OF BUFFALO BAYOU FC DATA AT FLOW < 100 CFS
 ○ H&HS × PW&E ■ TNRRCC ◆ USGS

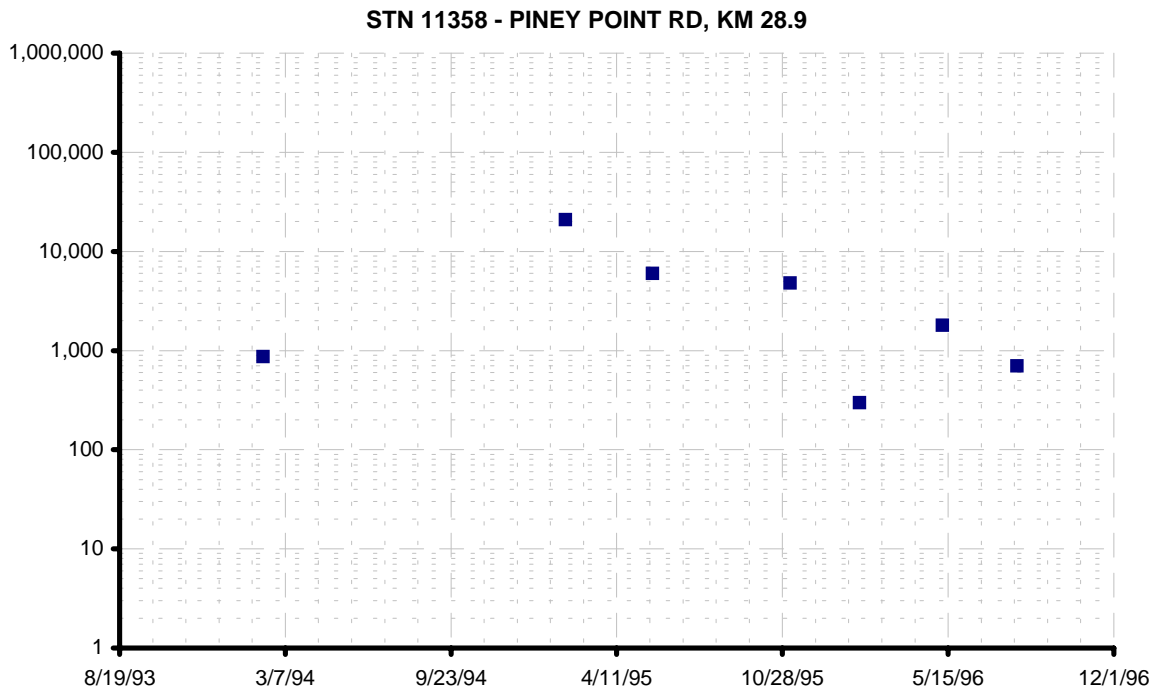
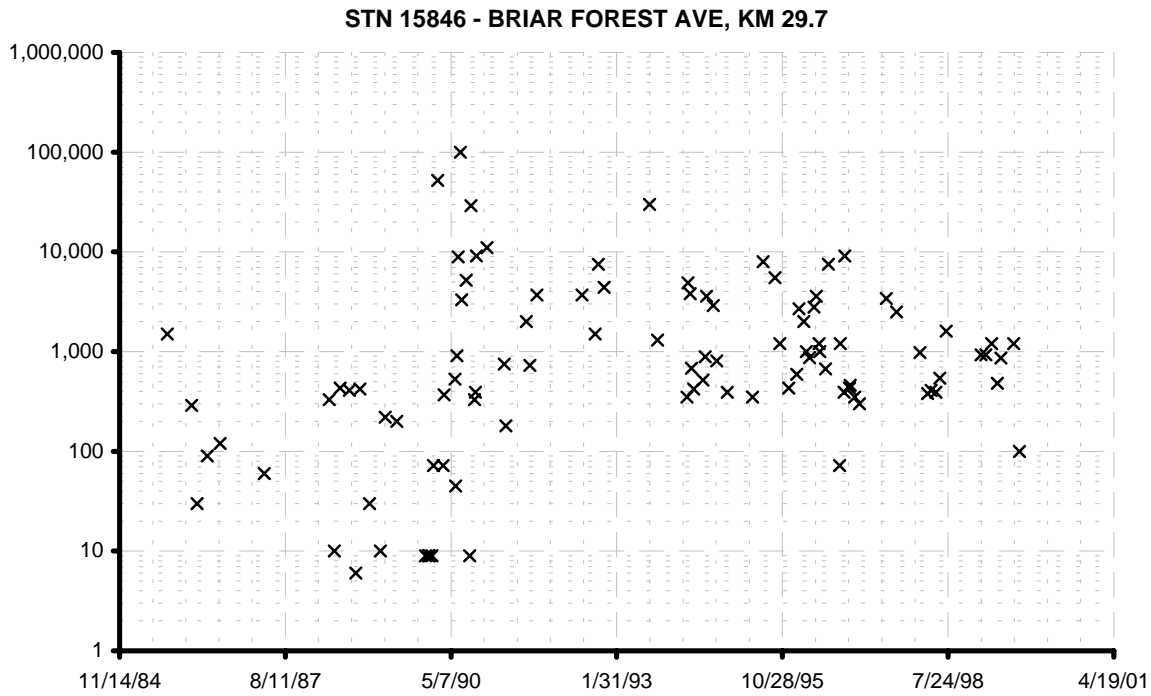


FIGURE 2.4 (CONTINUED)
TIME SERIES OF BUFFALO BAYOU FC DATA AT FLOW < 100 CFS
 ○ H&HS × PW&E ■ TNRCC ◆ USGS

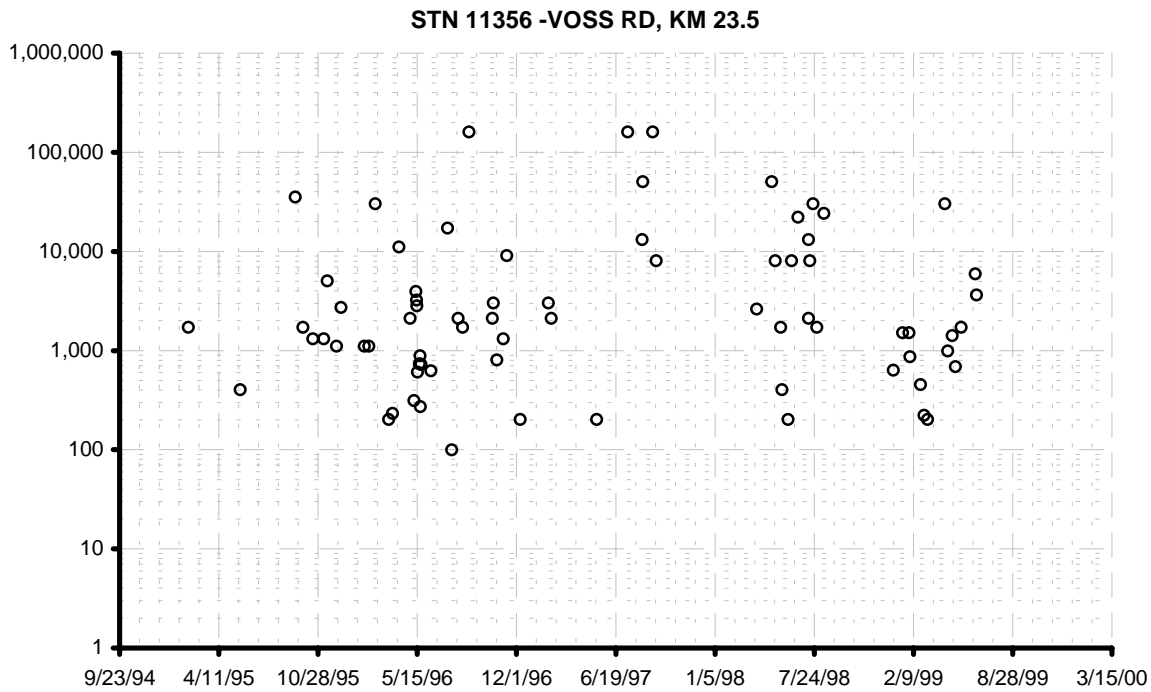
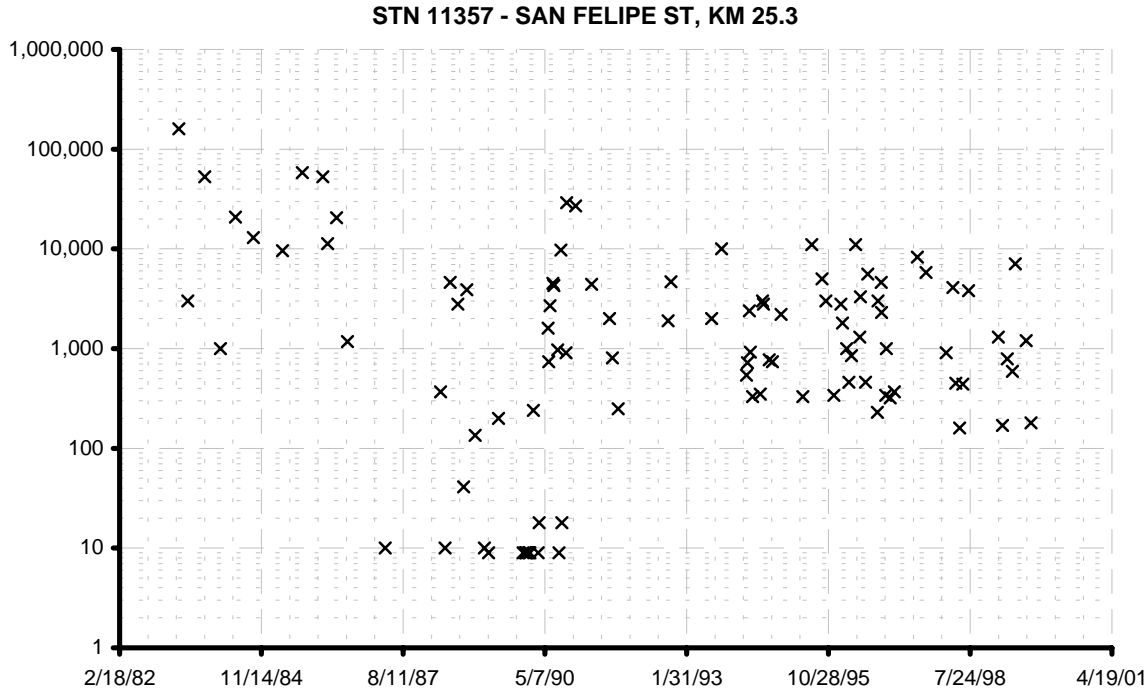


FIGURE 2.4 (CONTINUED)
TIME SERIES OF BUFFALO BAYOU FC DATA AT FLOW < 100 CFS
○ H&HS × PW&E ■ TNRCC ◆ USGS

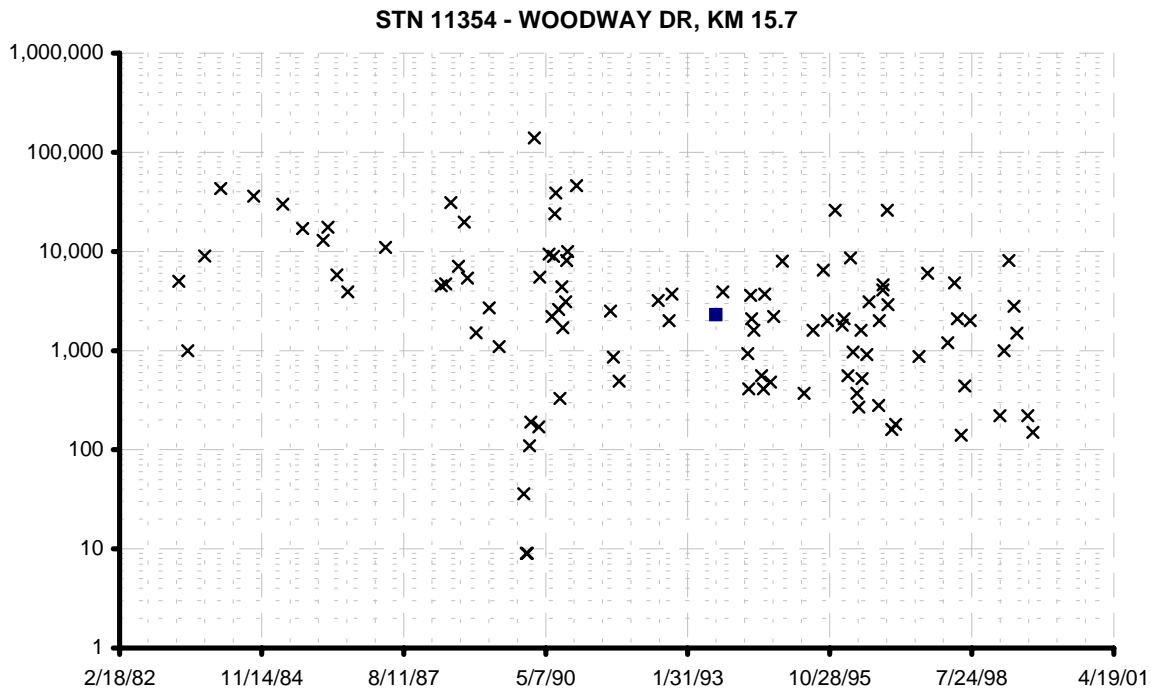
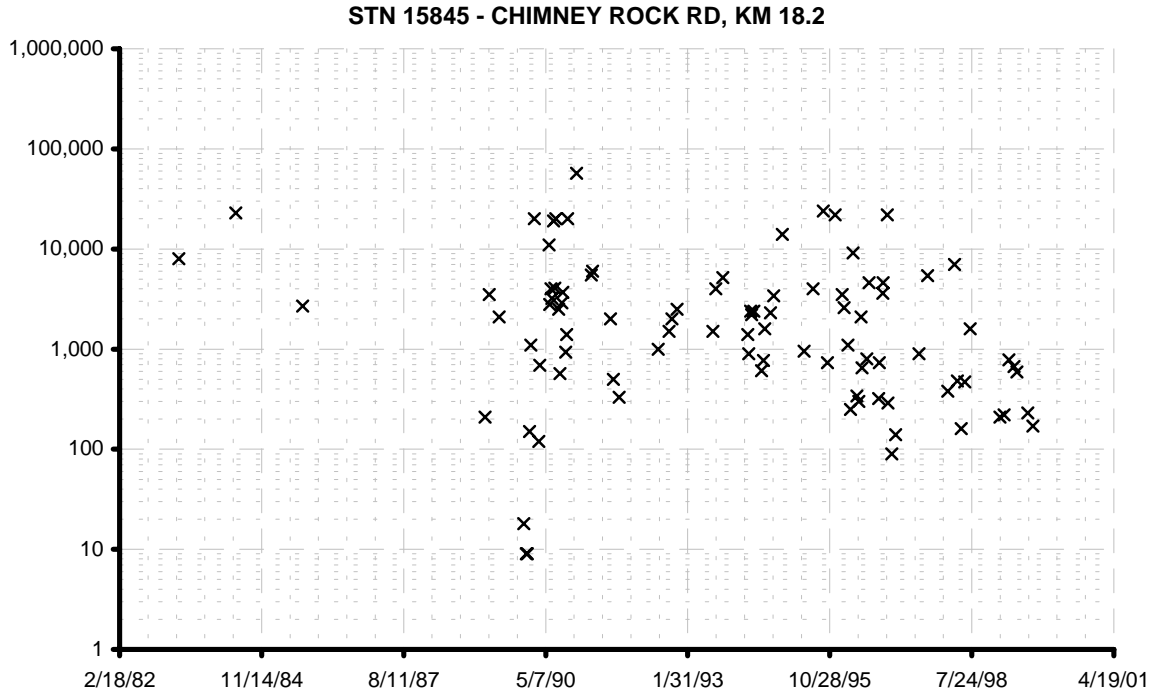


FIGURE 2.4 (CONTINUED)
TIME SERIES OF BUFFALO BAYOU FC DATA AT FLOW < 100 CFS
 ○ H&HS × PW&E ■ TNRCC ◆ USGS

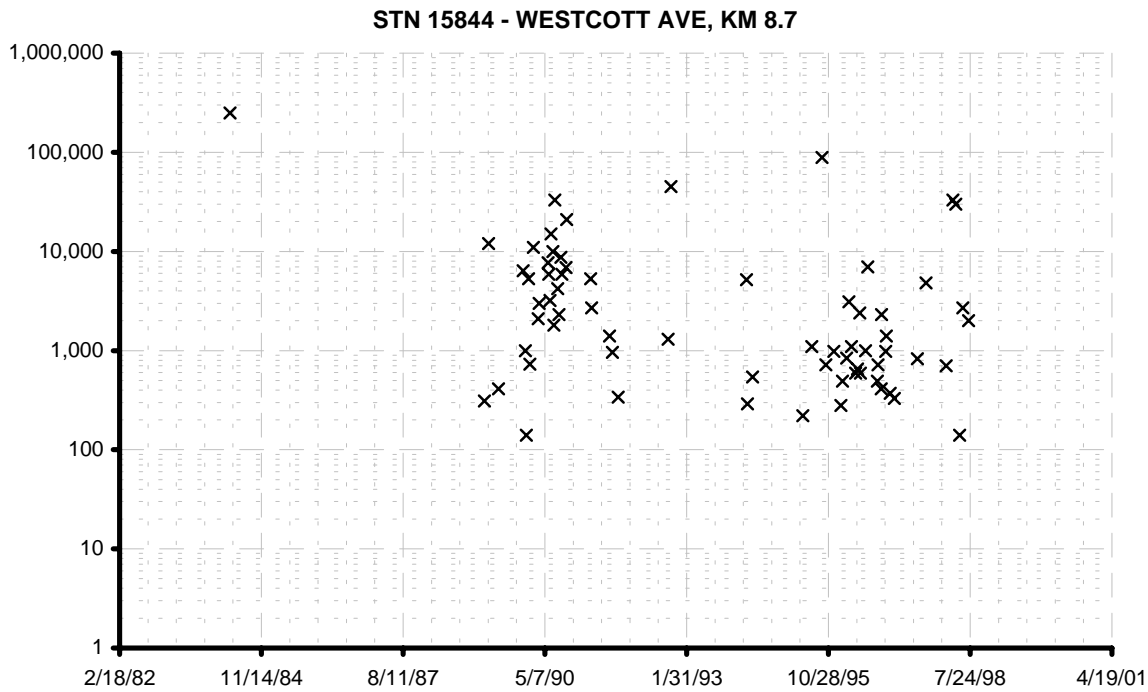
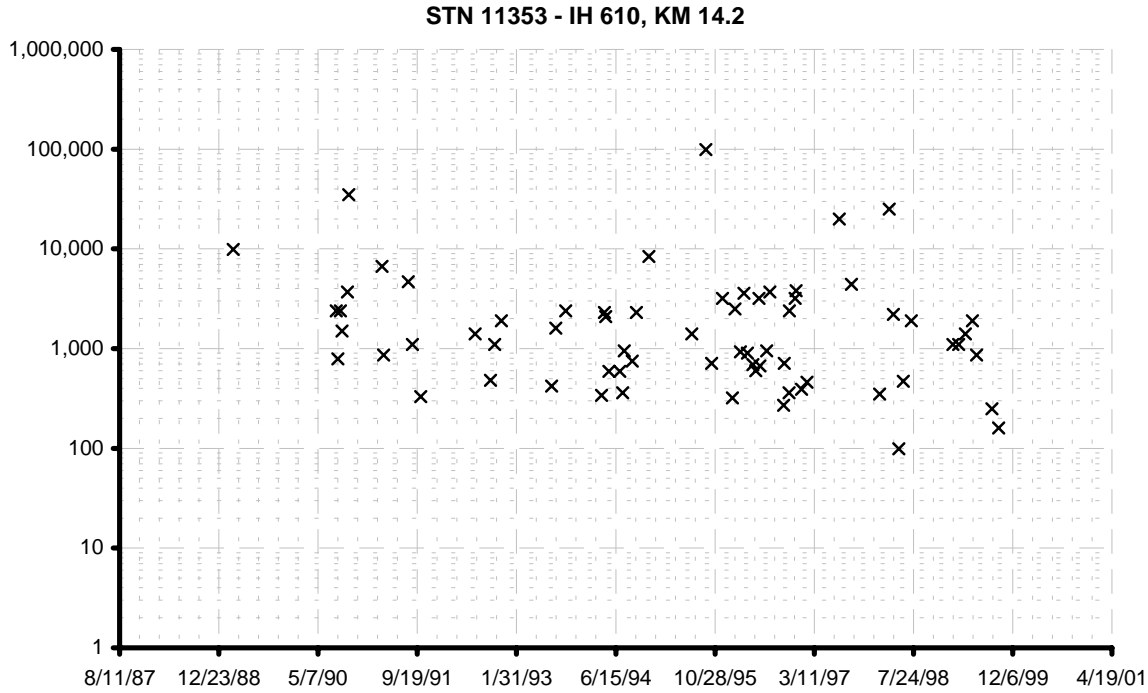


FIGURE 2.4 (CONTINUED)
TIME SERIES OF BUFFALO BAYOU FC DATA AT FLOW < 100 CFS
 ○ H&HS × PW&E ■ TNRCC ◆ USGS

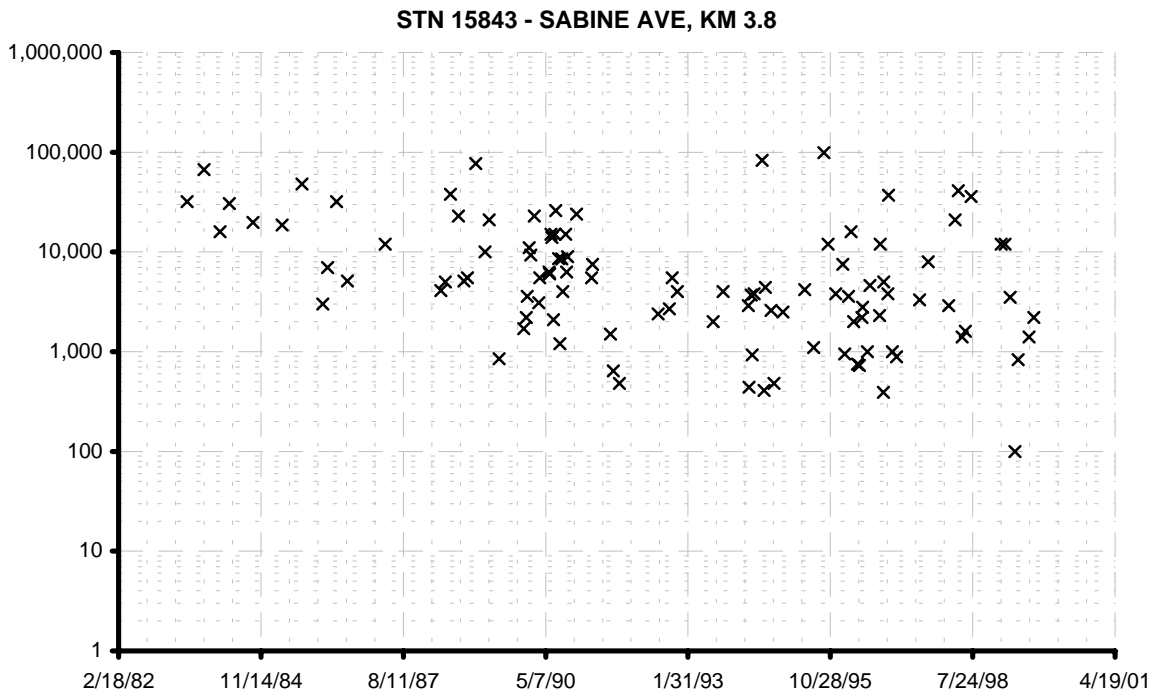
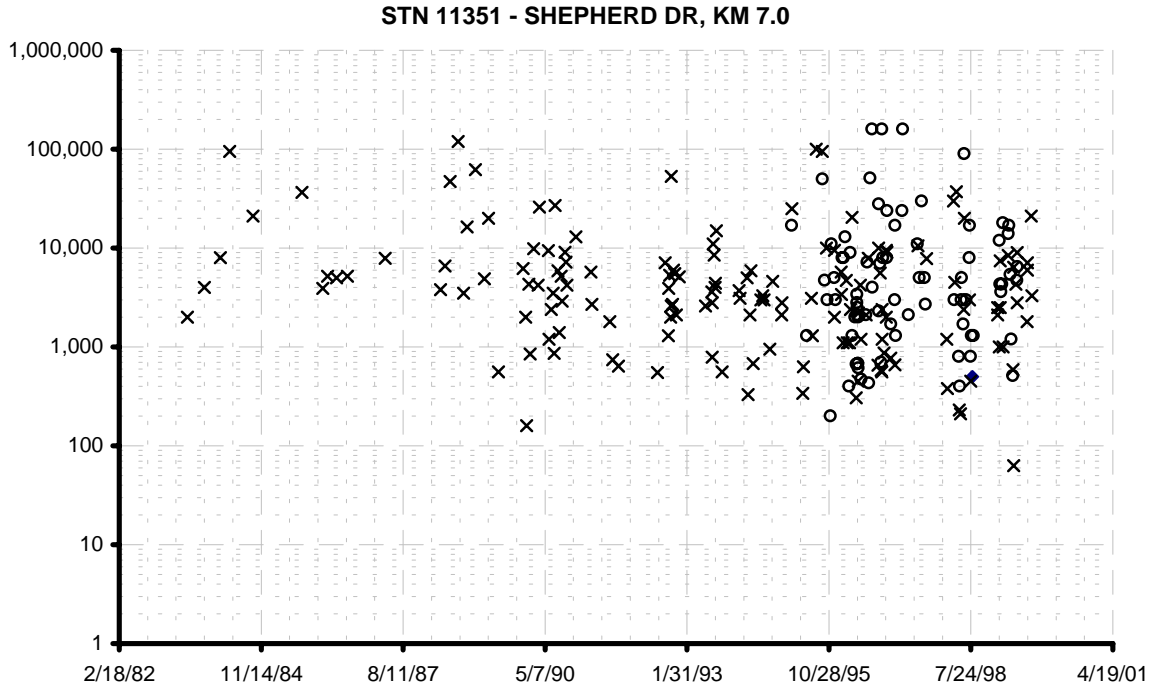


FIGURE 2.4 (CONTINUED)
TIME SERIES OF BUFFALO BAYOU FC DATA AT FLOW < 100 CFS
 ○ H&HS × PW&E ■ TNRCC ◆ USGS

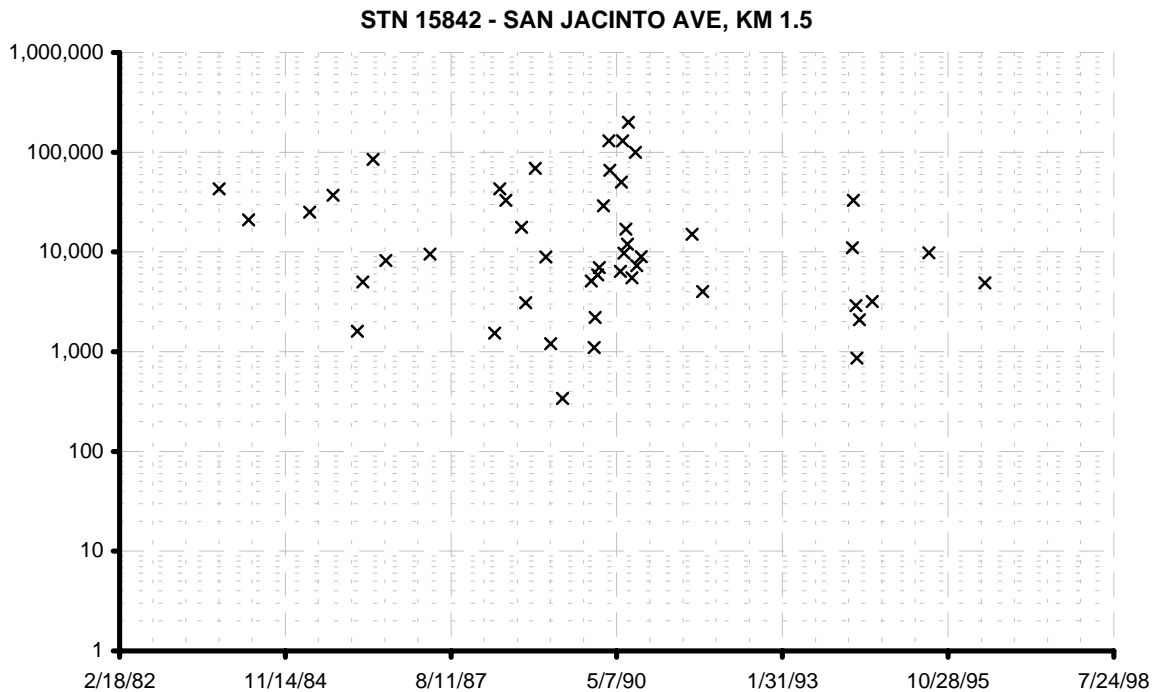
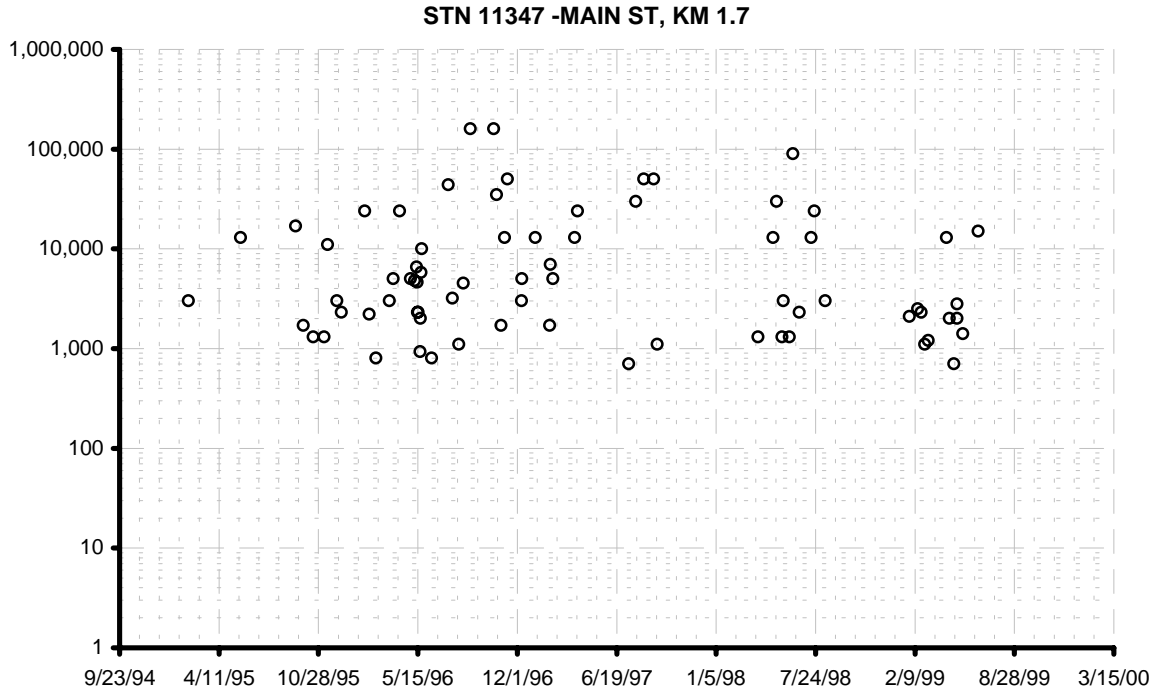


FIGURE 2.4 (CONCLUDED)
TIME SERIES OF BUFFALO BAYOU FC DATA AT FLOW < 100 CFS
 ○ H&HS × PW&E ■ TNRCC ◆ USGS

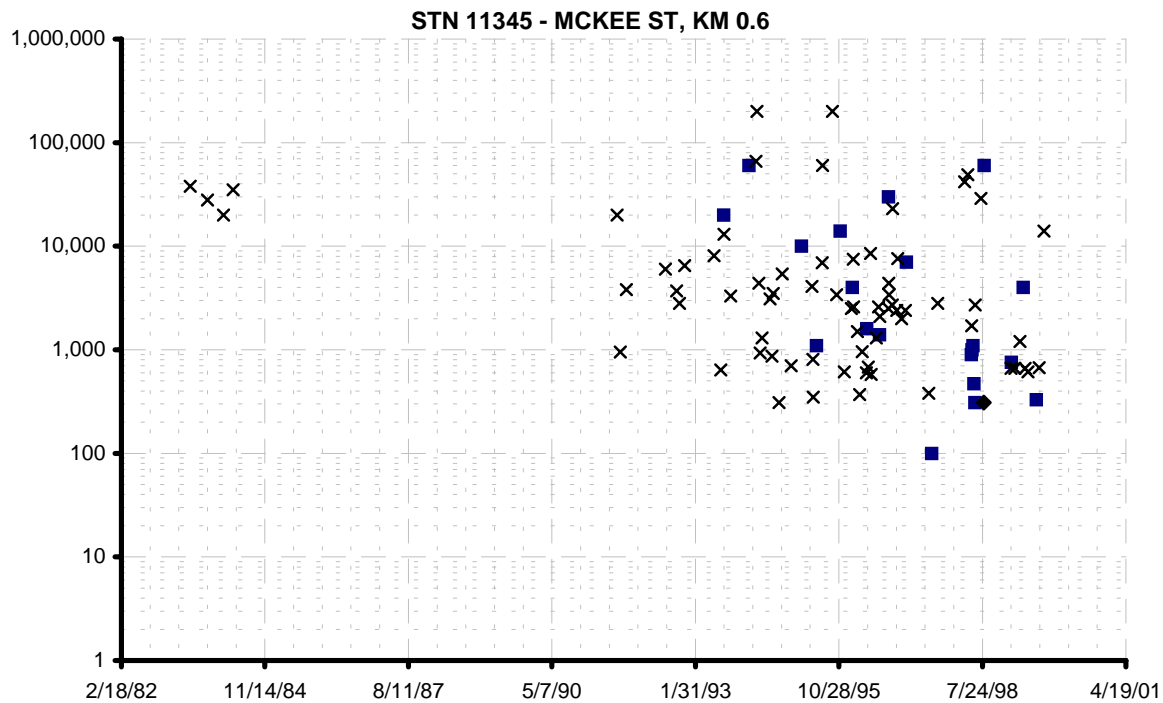


FIGURE 2.5
TIME SERIES OF WHITE OAK BAYOU FC DATA AT FLOW < 50 CFS

○ H&HS × PW&F ■ TNRCC ▮ USGS

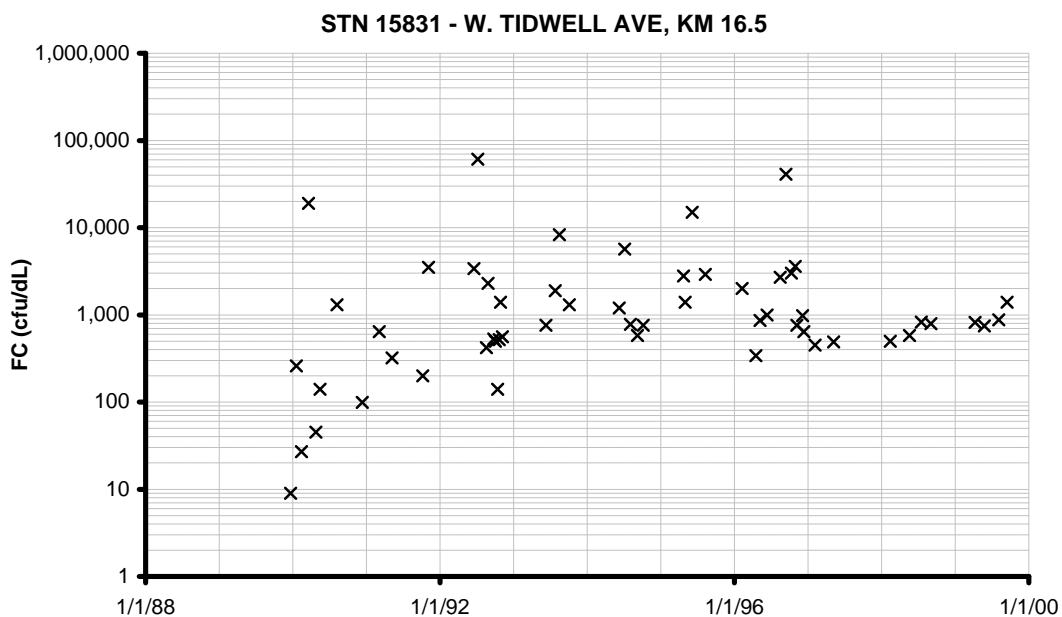
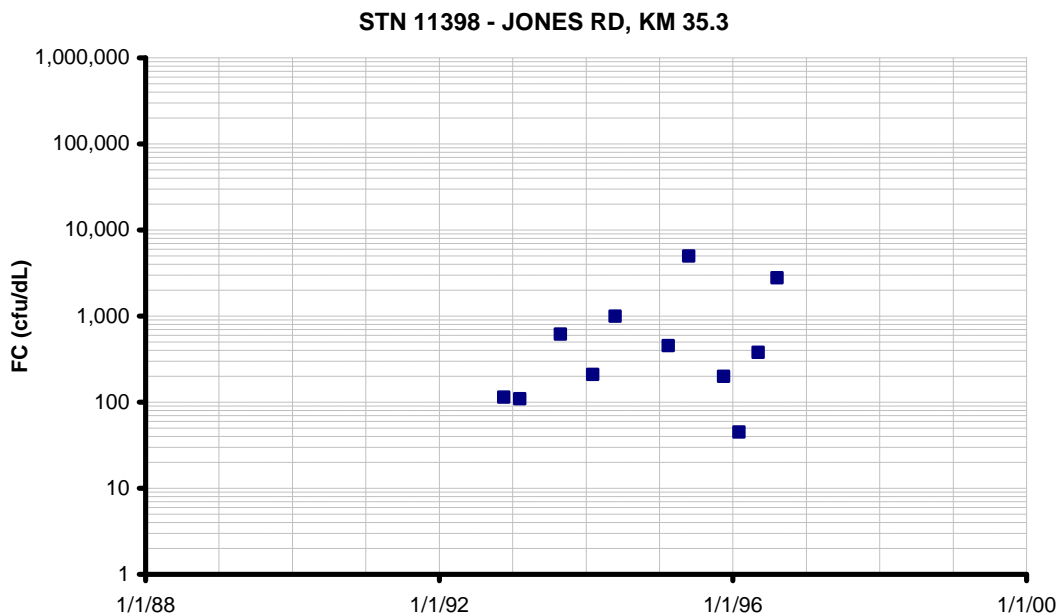


FIGURE 2.5 (CONTINUED)
TIME SERIES OF WHITE OAK BAYOU FC DATA AT FLOW < 50 CFS
○ H&HS × PW&F ■ TNRCC ▮ USGS

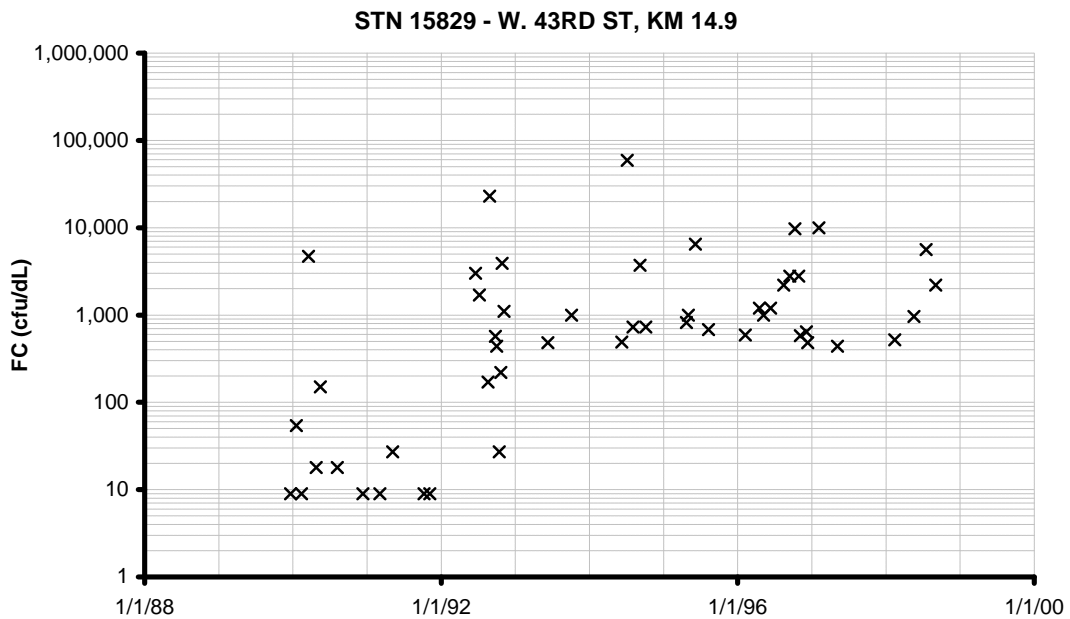
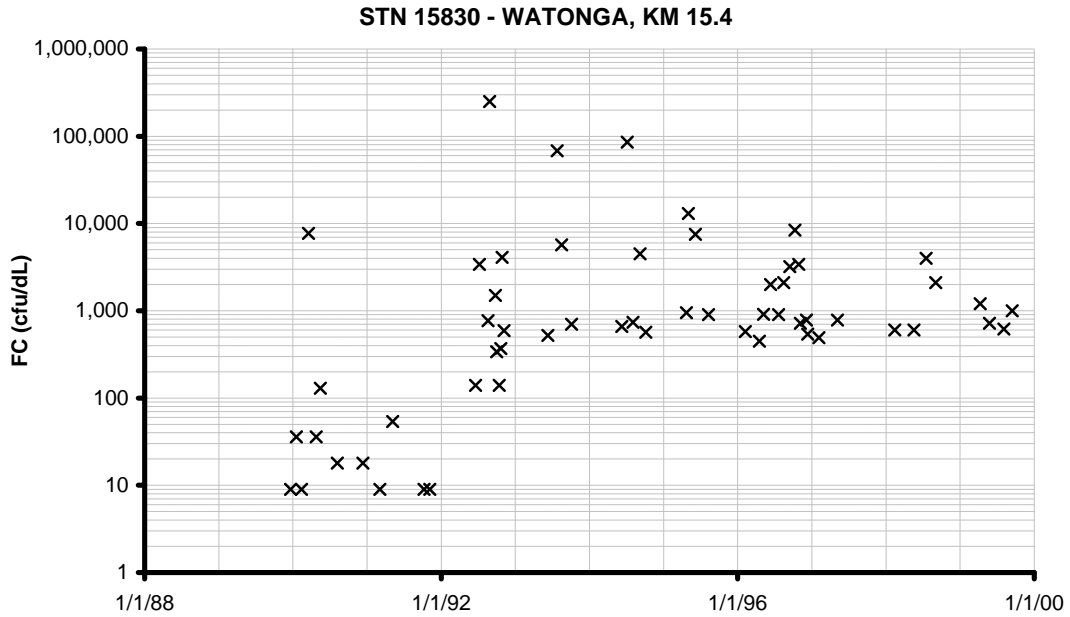


FIGURE 2.5 (CONTINUED)
TIME SERIES OF WHITE OAK BAYOU FC DATA AT FLOW < 50 CFS

○ H&HS x PW&F ■ TNRC ▮ USGS

STN 16637 - W. T C JESTER AVE, KM 12.7

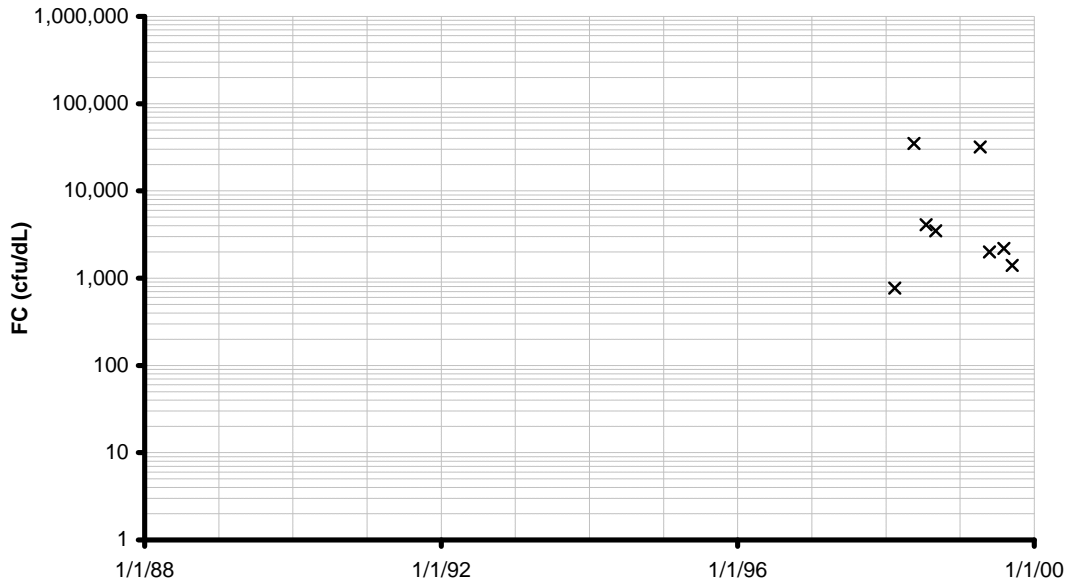


FIGURE 2.5 (CONTINUED)
TIME SERIES OF WHITE OAK BAYOU FC DATA AT FLOW < 50 CFS
○ H&HS × PW&F ■ TNRCC ▮ USGS

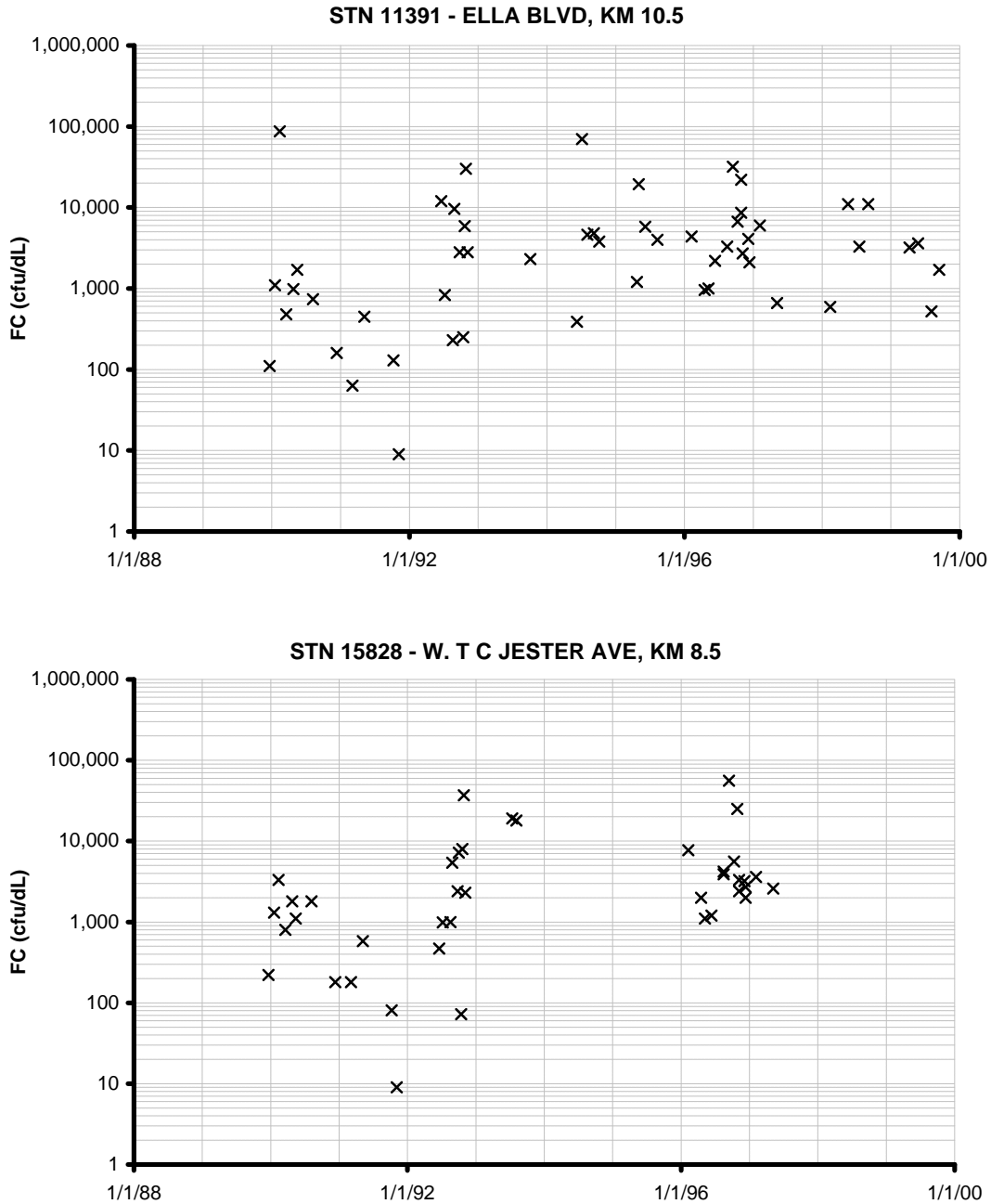


FIGURE 2.5 (CONTINUED)
TIME SERIES OF WHITE OAK BAYOU FC DATA AT FLOW < 50 CFS
○ H&HS × PW&E ■ TNRCC ▮ USGS

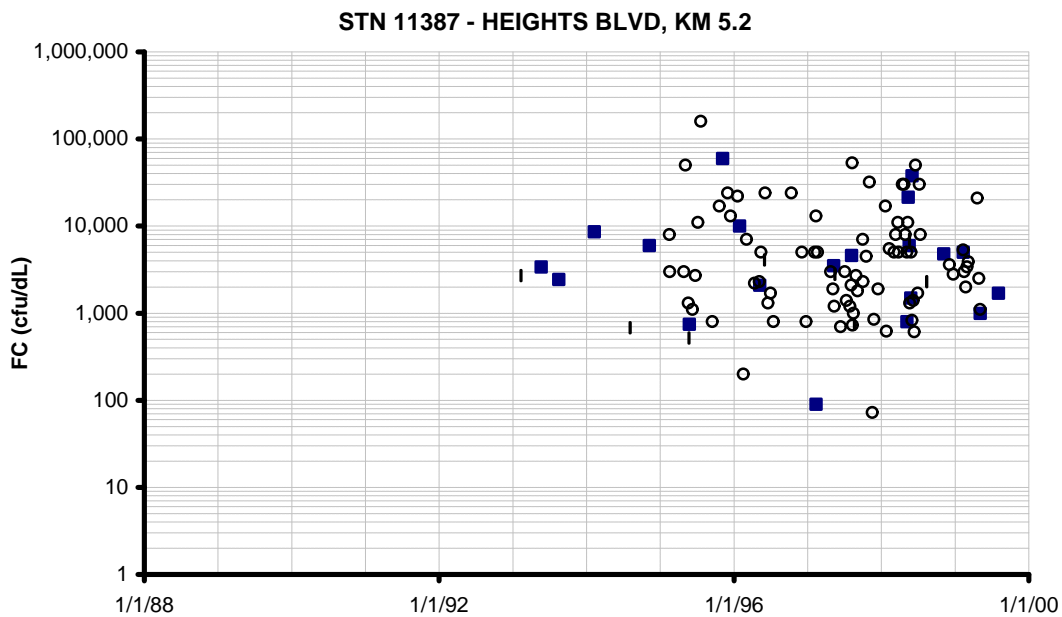
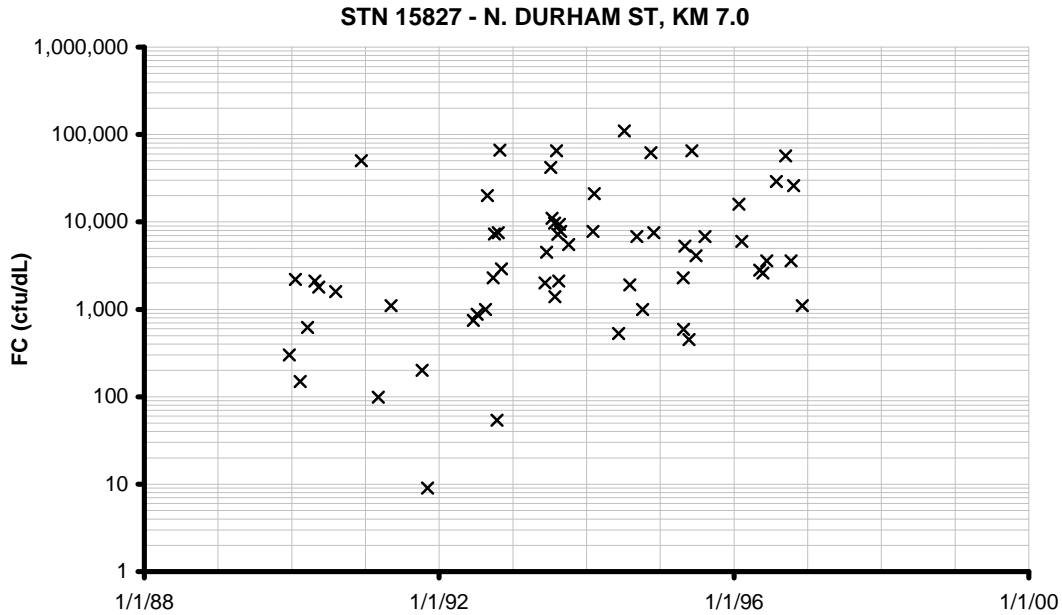


FIGURE 2.5 (CONTINUED)
TIME SERIES OF WHITE OAK BAYOU FC DATA AT FLOW < 50 CFS
○ H&HS × PW&E ■ TNRCC ▮ USGS

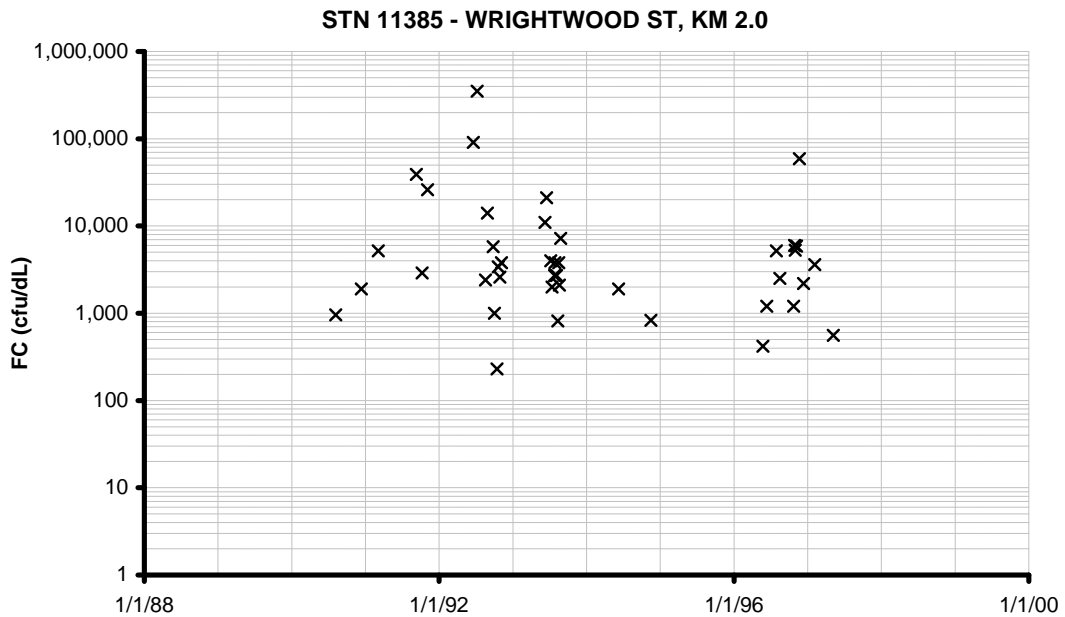
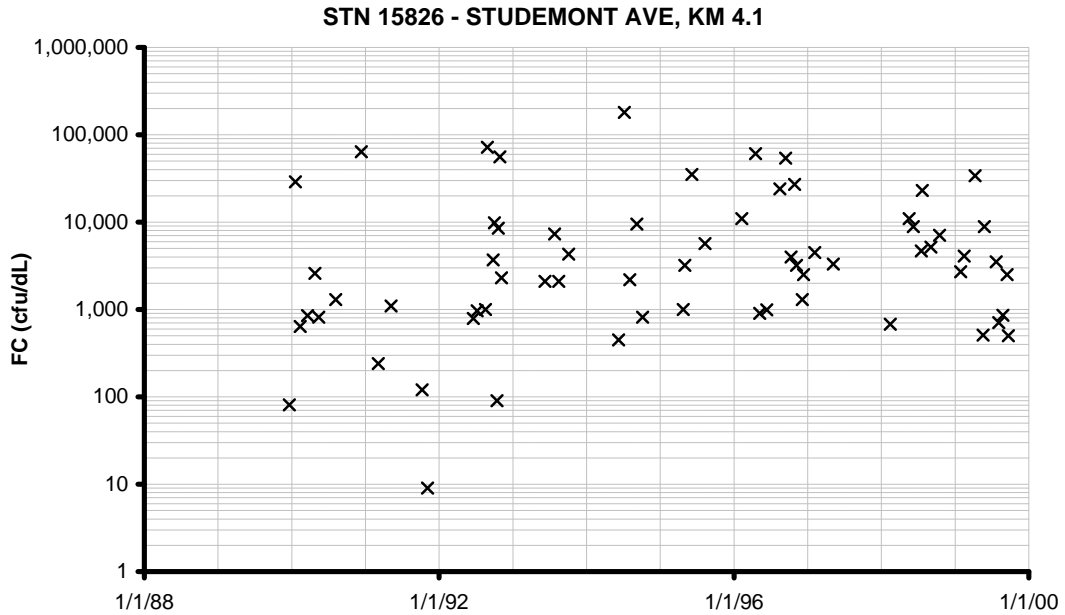


FIGURE 2.5 (CONTINUED)
TIME SERIES OF WHITE OAK BAYOU FC DATA AT FLOW < 50 CFS

○ H&HS × PW&F ■ TNRCC ▮ USGS

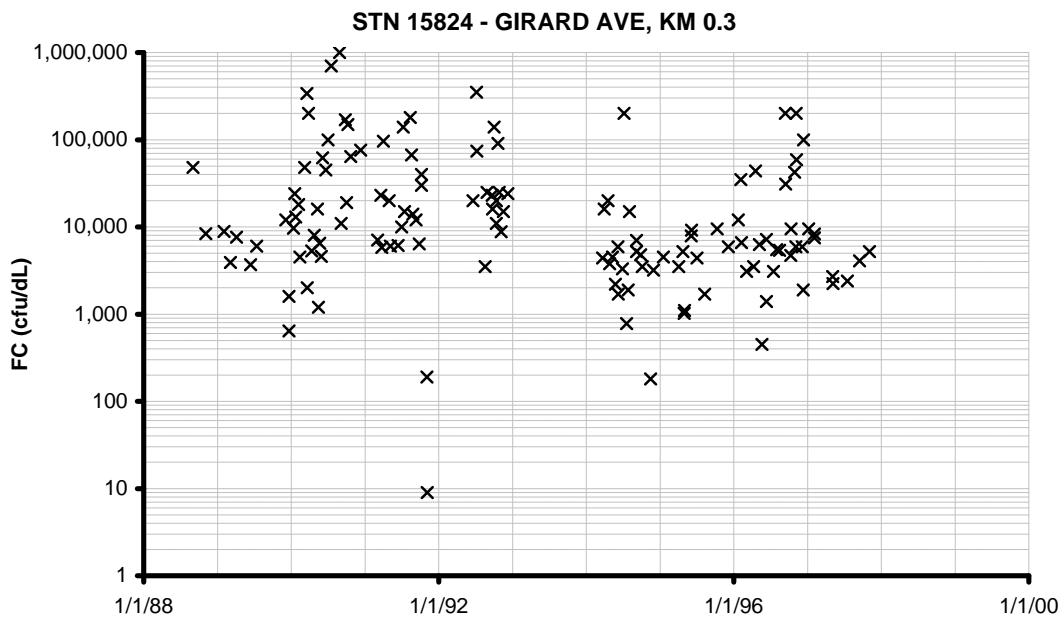
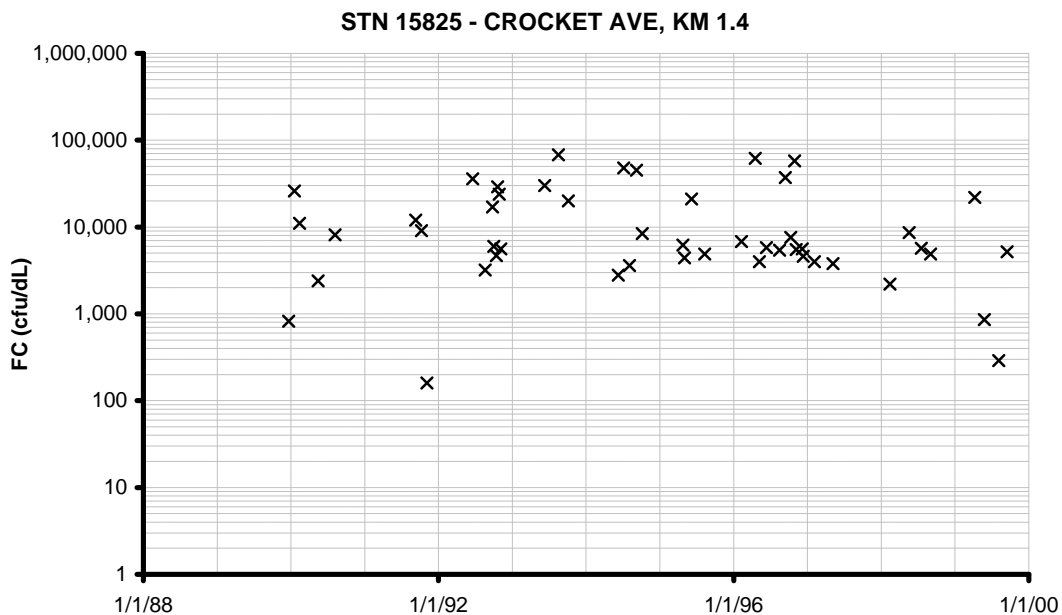
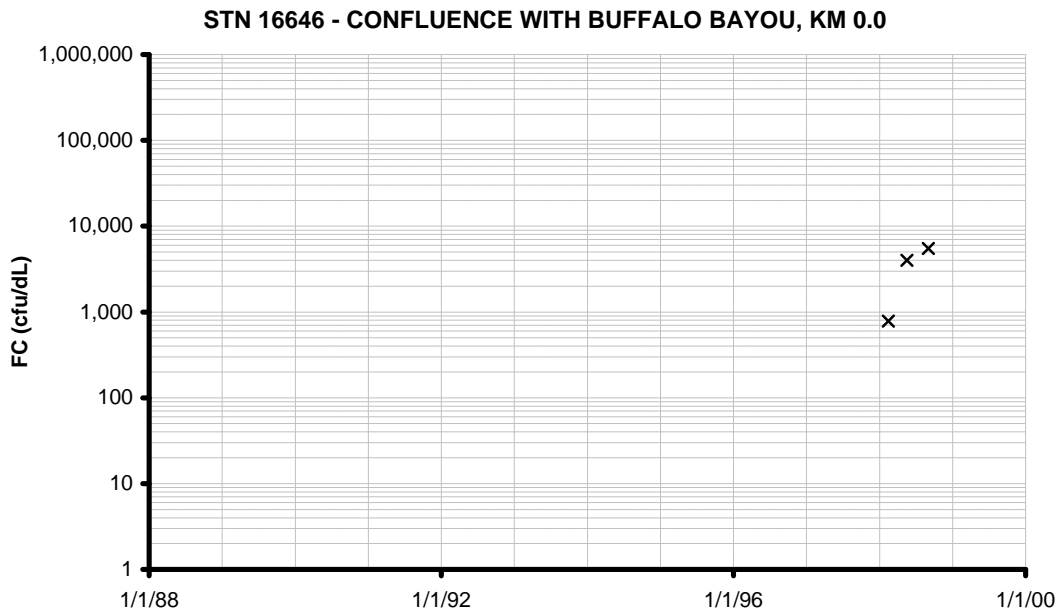
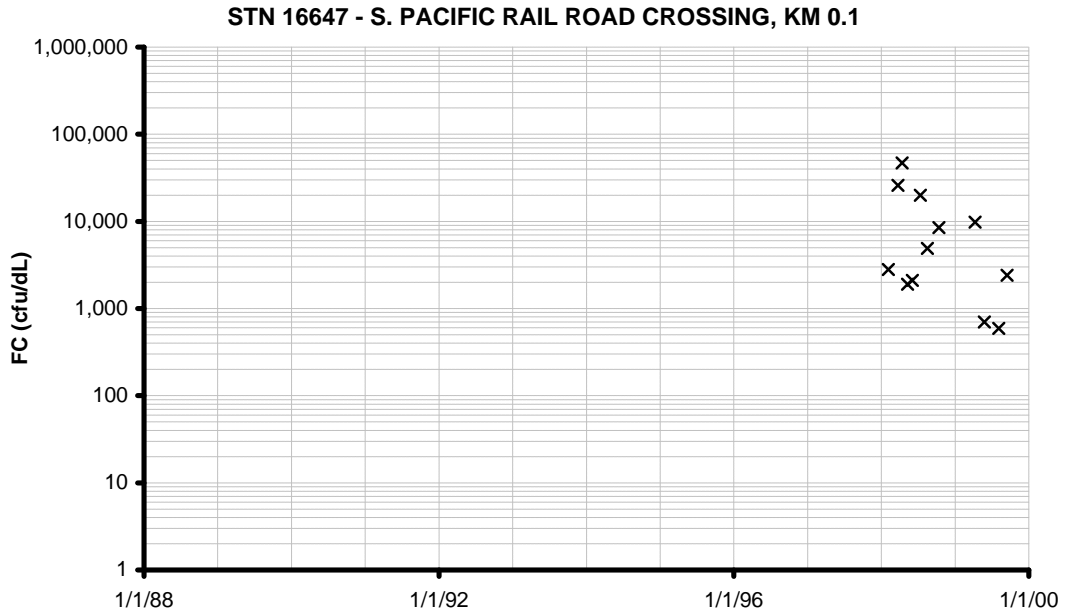


FIGURE 2.5 (CONCLUDED)
TIME SERIES OF WHITE OAK BAYOU FC DATA AT FLOW < 50 CFS
○ H&HS × PW&F ■ TNRCC ▮ USGS



the effluent prior to the time when dechlorination had become a common practice in the wastewater treatment process. The presence of these low values complicates the trend analysis. Therefore, trend analysis was performed on the data since 1992, excluding the earlier data with the low FC values.

The major effort of upgrading the sewer system through the Greater Houston Wastewater Program (GHWP) was completed in 1997. The major effort towards the end of the GHWP dealt with capacity to handle high flow conditions and minimize wet weather overflows. Work on the sewer system correcting dry weather overflows occurred very early and was substantially complete by 1990. If there were a change in bacteria levels resulting from this work, it should be present in the data before 1990.

A visual examination of the time series plots indicates that for most of the stations, there does not appear to be a trend in the data since 1992. Statistical testing was performed to confirm this visual observation. The results are shown in Table 2.5. The null hypothesis of zero slope in the temporal trend is rejected at the 95% confidence level at five stations on Buffalo Bayou and two stations on Whiteoak Bayou. The slopes of the data at these stations are all negative, indicating that bacteria levels have been decreasing over time. For most of the stations, the slope was negative but the null hypothesis could not be rejected, indicating that the change in bacteria levels has not been strong in the last decade. This may be a reasonable result. Most of the improvements to the collection system that would be a factor at lower flows were completed by the early 1990s. With these two bayous there may have been no major changes in the period from 1992 to 1999.

TABLE 2.5
STATISTICAL TESTS OF TRENDS IN LOW FLOW FC DATA SINCE 1992

Station ID	Location	River km ¹	Num of data	Start date	End date	Slope ²	P-value ³	Null hypothesis ⁴
Buffalo Bayou								
11142	Barker Dam	45.3	85	07/06/92	12/31/98	-0.00018	0.1486	Accept
11142	Below Barker Dam	45.1	20	10/05/93	12/05/96	0.00003	0.9204	Accept
11364	SH 6	45.0	71	07/06/92	09/27/99	-0.00011	0.2015	Accept
11363	Eldridge Rd	42.4	45	04/26/94	09/27/99	-0.00006	0.6330	Accept
11362	Dairy Ashford Rd	40.2	76	07/06/92	09/27/99	-0.00021	0.0459	Reject
11361	Wilcrest Dr	36.7	43	04/26/94	09/27/99	-0.00006	0.6711	Accept
11360	West Belt	34.6	127	07/06/92	09/27/99	-0.00005	0.5989	Accept
11359	Gessner Dr	31.5	54	07/06/92	09/27/99	-0.00022	0.0271	Reject
15846	Briar Forest Ave	29.7	56	07/06/92	09/27/99	-0.00028	0.0033	Reject
11358	Piney Point Rd	28.9	7	02/08/94	08/06/96	-0.00054	0.5668	Accept
11357	San Felipe St	25.3	53	09/22/92	09/27/99	-0.00015	0.1694	Accept
11356	Voss Rd	23.5	73	02/09/95	06/17/99	0.00014	0.4771	Accept
15845	Chimney Rock Rd	18.2	57	07/06/92	09/27/99	-0.00033	0.0024	Reject
11354	Woodway Dr	15.7	55	07/06/92	09/27/99	-0.00017	0.1268	Accept
11353	IH 610	14.2	55	07/06/92	09/27/99	-0.00004	0.6732	Accept
15844	Westcott Ave	8.7	37	09/22/92	07/13/98	-0.00005	0.8289	Accept
11351	Shepherd Dr	7.0	184	07/06/92	09/27/99	0.00000	0.9694	Accept
15843	Sabine Ave	3.8	56	07/06/92	09/27/99	0.00002	0.8297	Accept
11347	Main St	1.7	72	02/09/95	06/17/99	-0.00012	0.4424	Accept
15842	San Jacinto Ave	1.5	8	03/30/94	06/05/96	0.00015	0.8303	Accept
11345	McKee St	0.6	84	07/06/92	09/27/99	-0.00026	0.0197	Reject
White Oak Bayou								
11398	Jones Rd	35.3	11	11/17/92	08/07/96	0.00038	0.3706	Accept
15831	W. Tidwell Ave	16.5	44	06/18/92	09/15/99	-0.00007	0.4692	Accept
15830	Watonga	15.4	45	06/18/92	09/15/99	-0.00010	0.4523	Accept
15829	W. 43rd St	14.9	38	06/18/92	09/02/98	0.00014	0.3236	Accept
16637	W. T C Jester Ave (nr W. 34th St)	12.7	8	02/13/98	09/15/99	-0.00031	0.7887	Accept
11390	W. 34th St	12.5	47	07/07/92	09/15/99	-0.00007	0.4887	Accept
11391	Ella Blvd	10.5	41	06/18/92	09/15/99	-0.00001	0.9624	Accept
15828	W. T C Jester Ave (nr W. 12th St)	8.5	28	06/18/92	05/07/97	0.00012	0.4648	Accept
15827	N. Durham St	7.0	48	06/18/92	12/05/96	0.00018	0.3611	Accept
11387	Heights Blvd	5.2	108	02/08/93	08/03/99	-0.00002	0.8531	Accept
15826	Studemont Ave	4.1	53	06/18/92	09/21/99	-0.00001	0.9055	Accept
11385	Wrightwood St	2.0	35	06/18/92	05/07/97	-0.00019	0.2531	Accept
15825	Crocket Ave	1.4	41	06/18/92	09/15/99	-0.00027	0.0065	Reject
15824	Girard Ave	0.3	77	06/18/92	11/03/97	-0.00026	0.0370	Reject
16647	S. Pacific RR Crossing	0.1	12	02/04/98	09/15/99	-0.00153	0.0802	Accept
16646	Confluence with Buffalo Bayou	0.0	3	02/13/98	09/02/98	0.00415	0.2600	Accept

¹ For Buffalo Bayou, 0 km is at boundary of Segment 1013 with Segment 1007.

For White Oak Bayou, 0 km is at confluence with Buffalo Bayou.

² Slope of temporal trend is calculated with log data.

³ If P-value is less than 0.05, the null hypothesis is rejected.

⁴ Null hypothesis is that the slope of the temporal trend in the data is zero. Null hypothesis is tested at the 95% confidence level.

⁵ Reference: Statistical Analysis for Engineers by J. Wesley Barnes, 1988.

Comparison of Data for Different Periods

Some of the various maintenance and recovery programs were implemented in the early part of the time frame between 1990 and year 2000, while others took place in the latter half of the period. Therefore, a comparison of the data obtained during the two periods (i.e. 1991-1995 and 1996-1999) was completed to evaluate if significant differences could be observed. Table 2.6 summarizes the results of this analysis. Two sets of comparisons were made: one for moderate flow data (flow<100 cfs and 50 cfs for Buffalo and Whiteoak Bayous, respectively) and the other for high flow data. Results shown in Table 2.6 indicate that the moderate flow data did not show significant differences ($\alpha=0.05$) between the two time periods, with the exception of stations 15845, 11358, and 11345 in Buffalo Bayou. Significant differences between the two datasets were observed more frequently on the high flow data (5 stations). However, in general, the FC data did not show discernible differences for the period 1991-1999 and the impact of the various recovery programs cannot be assessed by this means.

2.2.2 Spatial Patterns

Figures 2.6 and 2.7 show the geometric means of the low flow FC data from 1992 to 1999 for Buffalo Bayou and Whiteoak Bayou respectively. The standard deviation is also shown to give an indication of the spread of the data. For those stations that have statistically significant temporal trends, the geometric means would be slightly lower if only recent data were used. The geometric means of the tributary data that were mainly collected by H&HS are also shown in the figures. All the stations have geometric means significantly above the contact recreation criterion of 200 cfu/dL. Most of the stations on

TABLE 2.6
STATISTICAL COMPARISON OF MEANS BETWEEN DATASETS COLLECTED DURING THE FIRST AND
SECOND HALF OF THE 90'S

Station	Moderate flow data ^a			High flow data ^a		
	t Stat	t crit. two-tail	Null hypothesis	t Stat	t crit. two-tail	Null hypothesis
Buffalo Bayou						
11142	1.47731	2.003239	Accept	-2.50559	1.990848	Reject
11364	1.403814	2.005745	Accept	-1.2827	2.03011	Accept
11363	0.921728	2.019542	Accept	-1.20378	2.068655	Accept
11362	1.806157	1.996564	Accept	-2.2354	2.032243	Reject
11361	0.195409	2.131451	Accept	-1.49316	2.073875	Accept
11360	-0.633	2.004044	Accept	-3.21205	1.980993	Reject
11359	1.689671	2.022689	Accept	-1.09714	2.068655	Accept
15846	1.818635	2.007582	Accept	-1.00812	2.063898	Accept
11358	4.848573	2.776451	Reject			
11357	0.632167	2.006645	Accept	-1.33669	2.039515	Accept
11356	-0.25834	2.160368	Accept	0.211994	2.160368	Accept
15845	3.185935	2.000297	Reject	-1.6489	2.04227	Accept
11354	1.383579	2.004044	Accept	-1.66112	2.051829	Accept
11353	0.83239	2.004881	Accept	-1.929	2.055531	Accept
15844	0.728027	2.068655	Accept	-0.65021	2.079614	Accept
11351	0.250409	1.978237	Accept	-0.97785	1.973535	Accept
15843	-0.18715	2.003239	Accept	-1.34742	2.063898	Accept
11347	-0.95516	2.160368	Accept	0.742856	2.131451	Accept
15842	0.019698			-0.04736		
11345	2.31331	1.997137	Reject	0.032496	2.028091	Accept
White Oak Bayou						
11398	0.088932	3.182449	Accept			
15831	0.524723	2.01894	Accept	-0.96382	2.200986	Accept
15830	-0.32263	2.036932	Accept	-1.14938	2.178813	Accept
15829	-1.90233	2.028091	Accept	-3.00531	2.178813	Reject
16637						
11390	-0.9126	2.03011	Accept	-1.79829	2.055531	Accept
11391	-1.21573	2.032243	Accept	-2.07854	2.051829	Reject
15828	-1.766278	2.079614	Accept	-1.01702	2.228139	Accept
15827	-1.48787	2.079614	Accept	-0.45468	2.306006	Accept
11387	1.050811	2.045231	Accept	-0.18042	2.02619	Accept
15826	-1.3101	2.015367	Accept	-0.82528	2.055531	Accept
11385	1.044336	2.059537	Accept	-0.16224	2.364623	Accept
15824	0.052834	1.992103	Accept	0.59792	2.051829	Accept
16647						
16646						

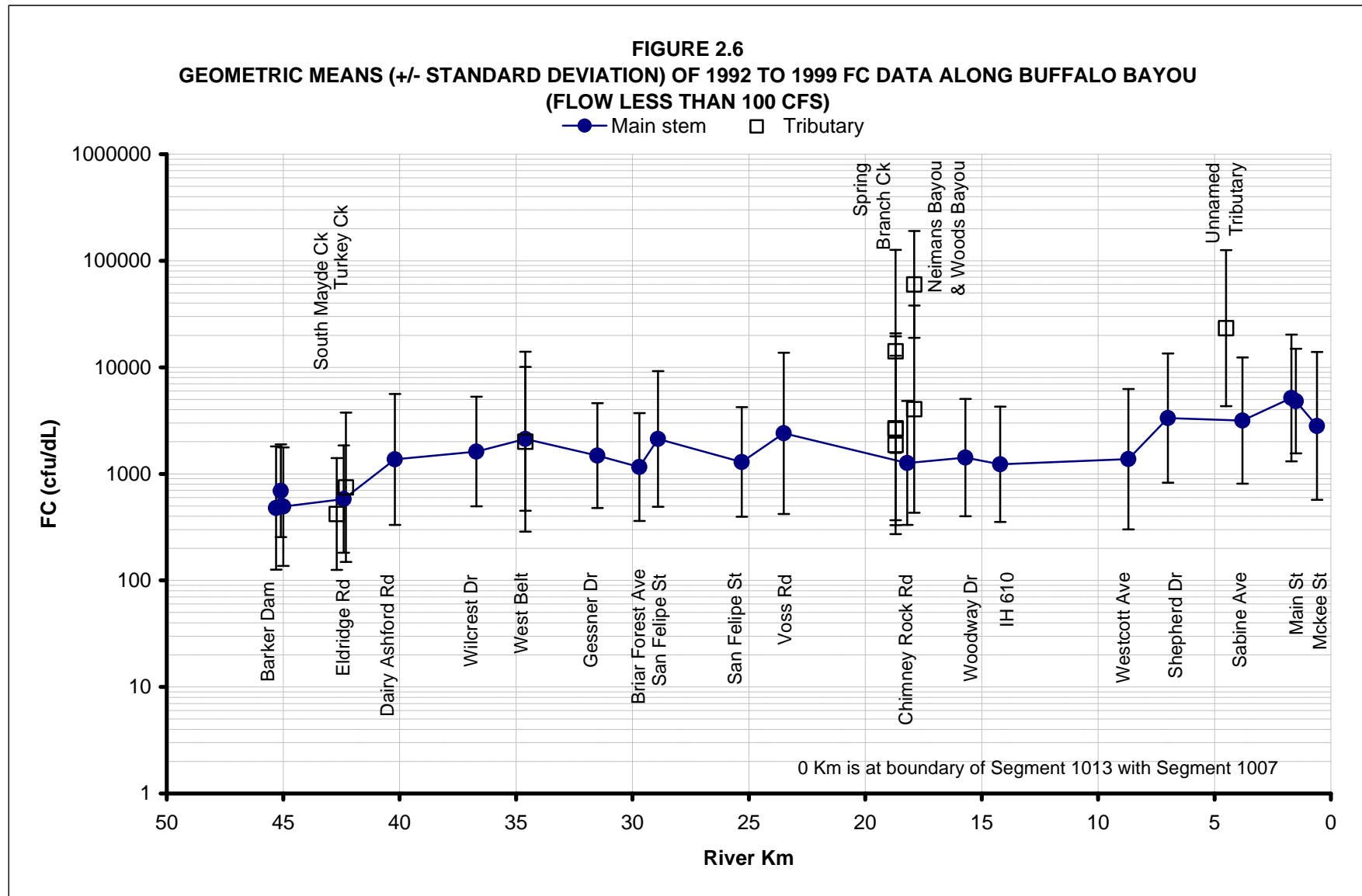
^a variable 1 - 1991-1995 data; variable 2 - 1996-1999 data

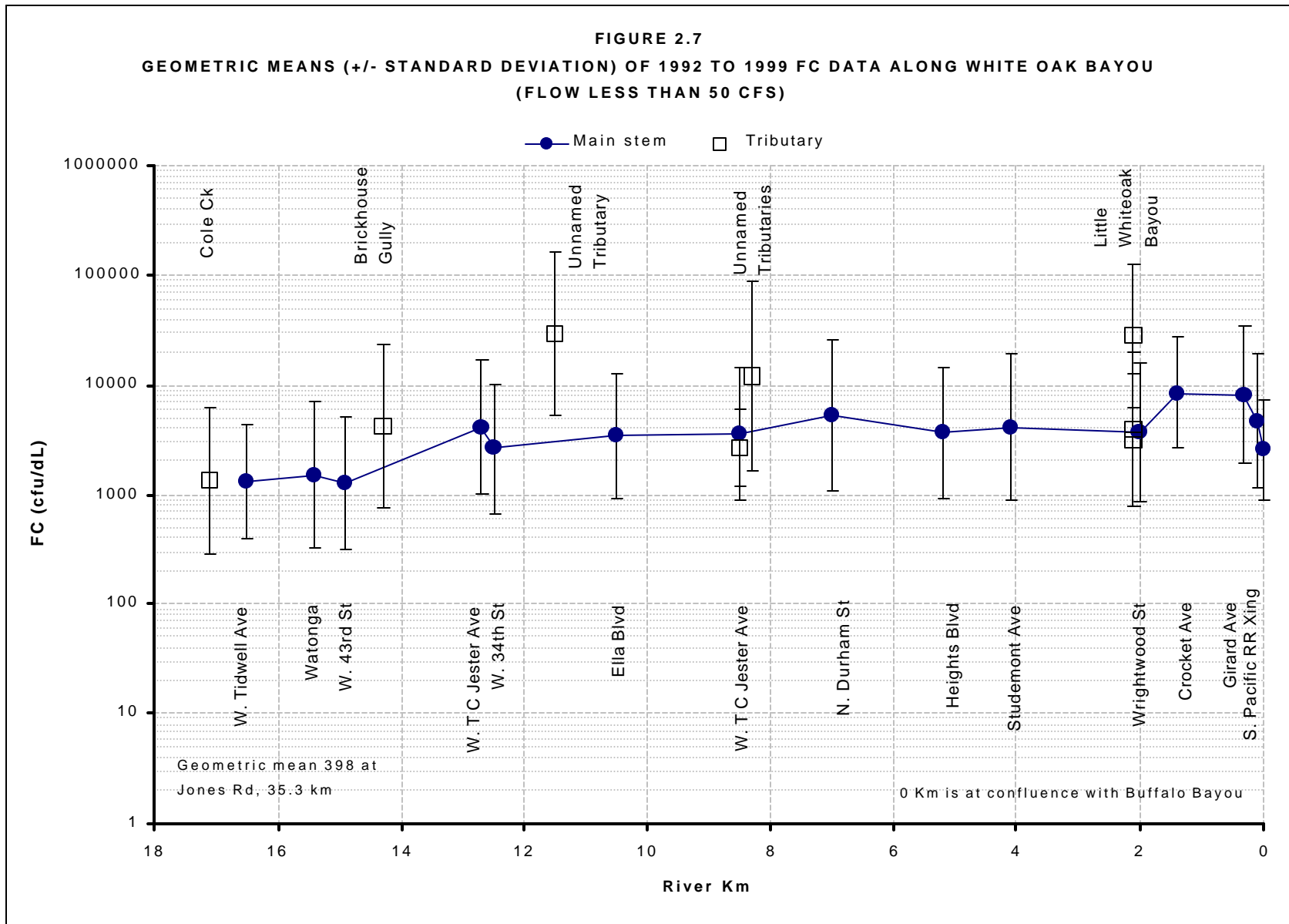
^b the null hypothesis is that the two datasets are not statistically different

The test performed was the t-test assuming unequal variances

The null hypothesis is rejected if $|t_{\text{stat}}| < t_{\text{crit}}$

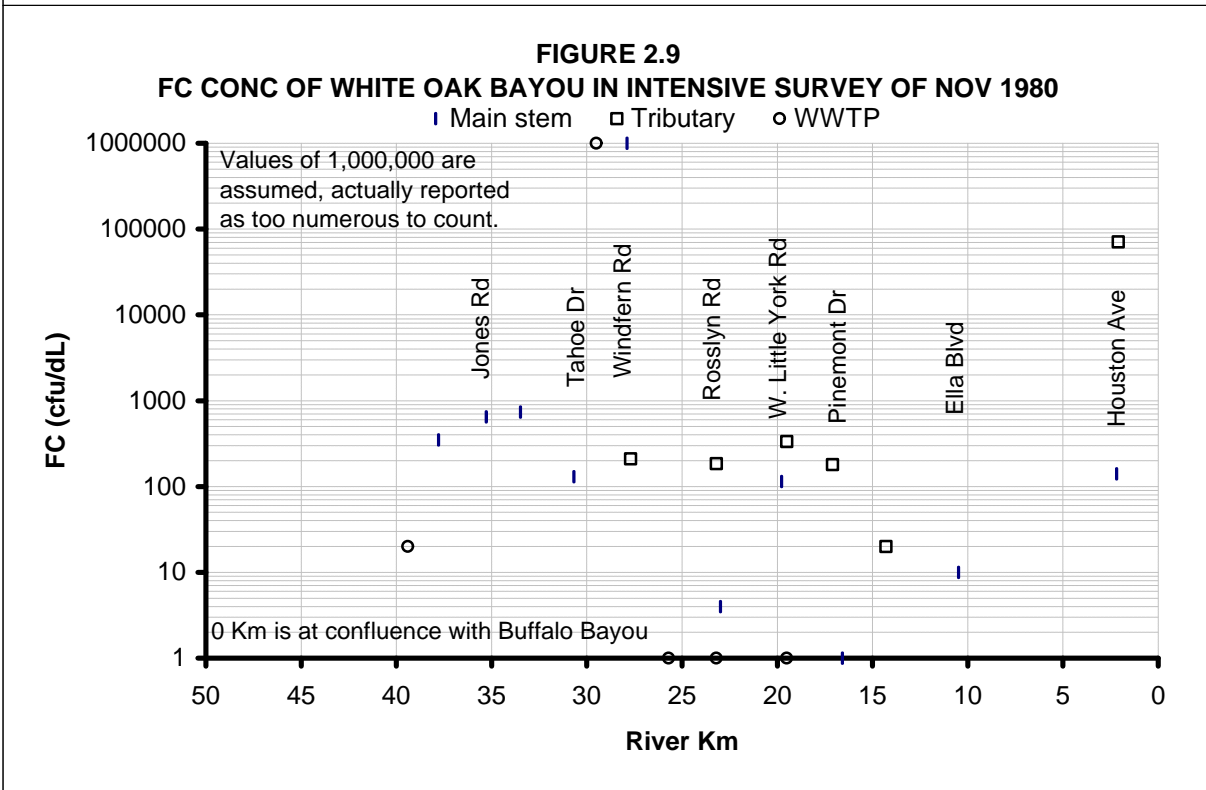
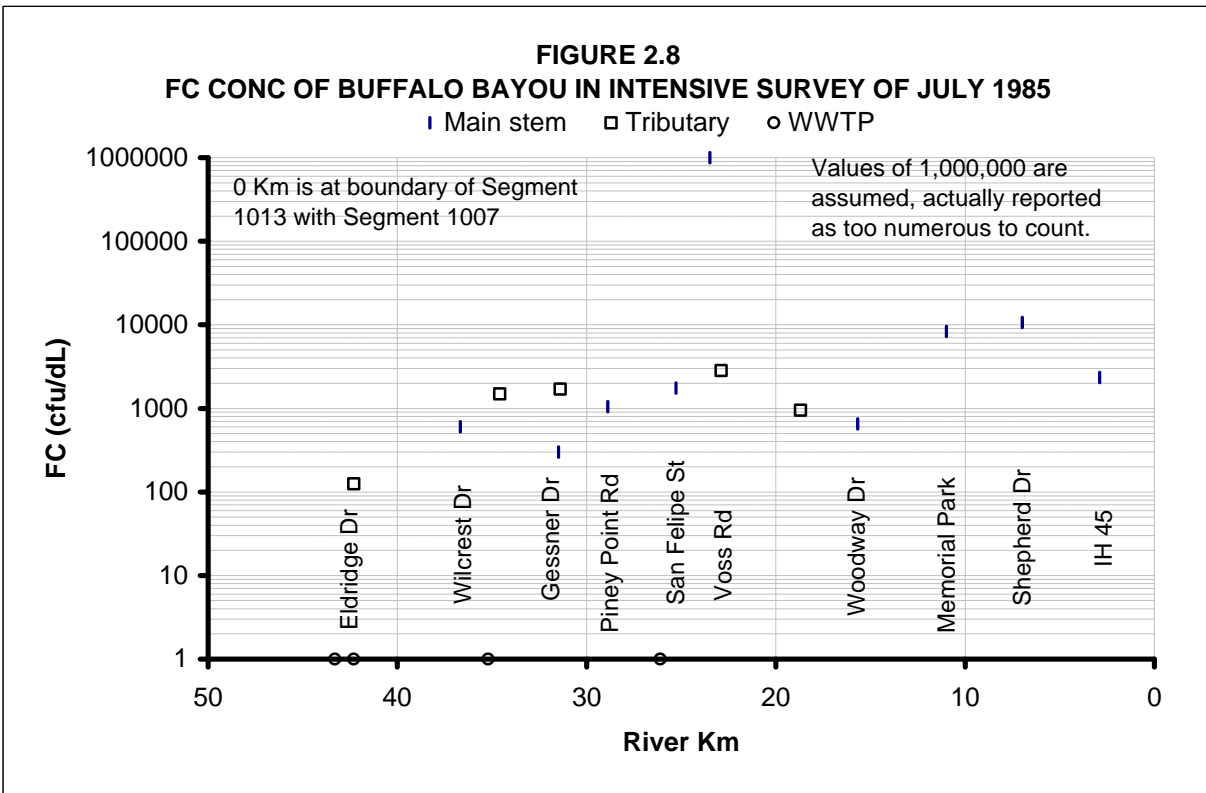
The null hypothesis is tested at the 95% confidence level





Buffalo Bayou have geometric means between 1000 and 3000 cfu/dL whereas most of the stations on Whiteoak Bayou have geometric means between about 3000 to 5000 cfu/dL. For both bayous, the bacteria level appears to be lower at the upstream end and higher at the downstream end. Most of the tributaries seem to have about the same bacteria level as the bayou, but there are a few that have higher bacteria levels. The bacteria level in Whiteoak Bayou is generally higher than that in Buffalo Bayou.

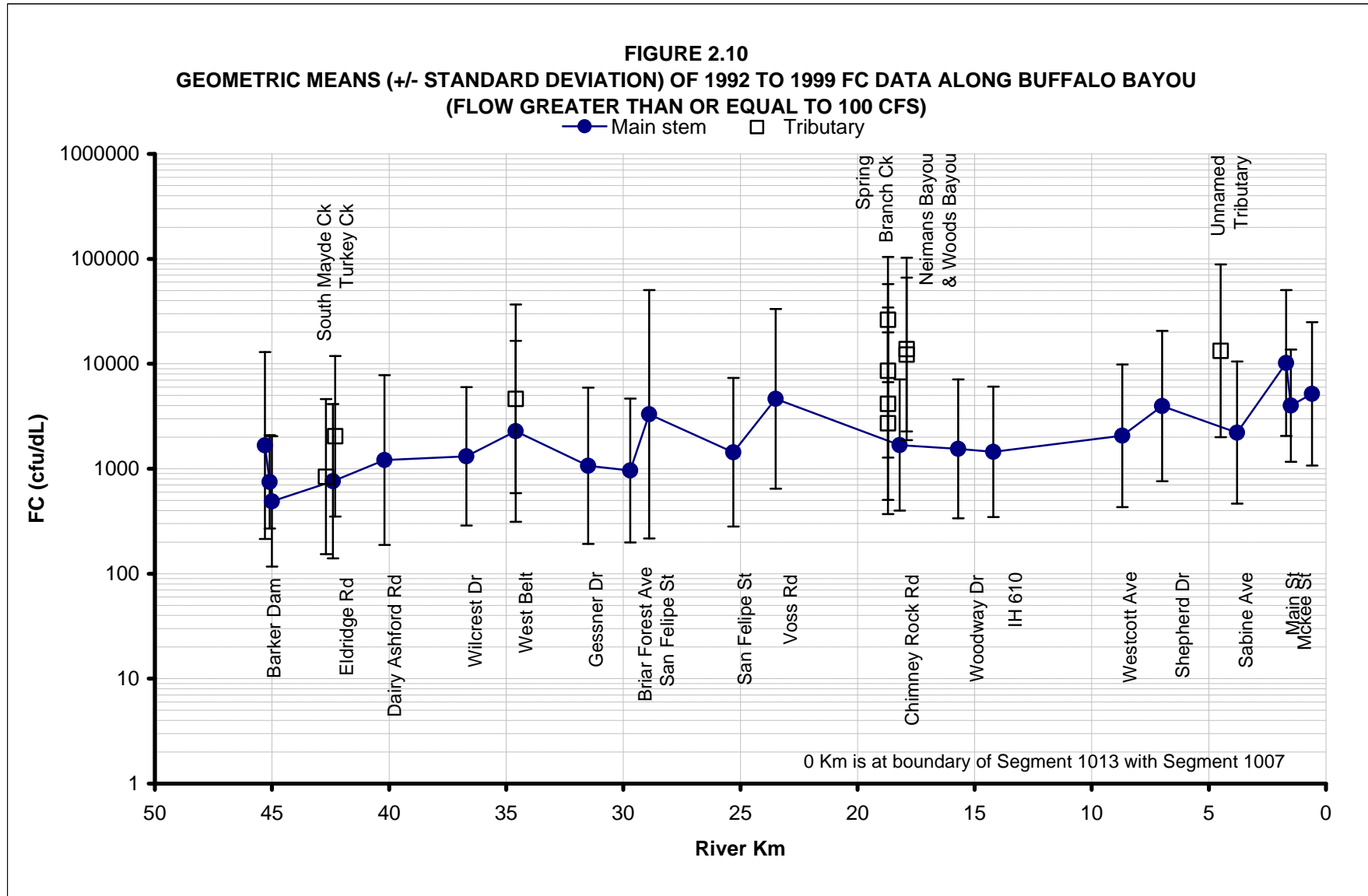
Figures 2.8 and 2.9 show the FC concentrations of samples collected under low flow conditions in an intensive survey of Buffalo Bayou in July 1985 and in an intensive survey of Whiteoak Bayou in November 1980 respectively. Samples were collected in the main stem and tributaries of each bayou and also from wastewater treatment plant (WWTP) outfalls. Almost all of the tributaries have bacterial levels close to that in the main stems. Except for one plant in the Whiteoak Bayou watershed, all the effluents from WWTPs have very low FC values because of chlorination. Given the fact that bacteria data are generally highly variable, the levels in the 1985 intensive survey of Buffalo Bayou appear to be consistent with that shown in Figure 2.6 for data in the '90s. This is not the case for Whiteoak Bayou. Except at a few locations, the FC values in the 1980 intensive survey of Whiteoak Bayou are below 1000 cfu/dL. However, the geometric means for the '90s data are all above 1000 cfu/dL as shown in Figure 2.7.



2.2.3 Data Collected at Flows above Median

Figures 2.10 and 2.11 show the geometric means of the FC data collected on days where the flow was at or above the screening values (approximately the median flows) from 1992 to 1999 for Buffalo Bayou and Whiteoak Bayou respectively. It should be noted that although a sample is associated with a higher flow, it might not be collected during the early stage of the runoff event when the bacteria level is usually very high. Moreover, as noted earlier, different agencies have different sampling strategies with respect to weather conditions and some of them are actually geared toward dry weather sampling. Nevertheless, this analysis of the high flow data gives a general indication of the effect of flow on the bacteria level.

Similar to the low flow data, the bacteria level appears to be lower at the upstream end and higher at the downstream end. For Buffalo Bayou, the geometric means of the high flow data are generally similar to those of the low flow data. On the other hand, for Whiteoak Bayou, the geometric means of the high flow data are generally higher than those of the low flow data. For both bayous, the high flow data have higher variability than the low flow data in terms of standard deviations. Table 2.7 shows the coefficients of variation (standard deviation divided by mean) for both the high and low flow data. For most of the stations on Buffalo Bayou, the coefficients of variation are higher for the high flow data. For Whiteoak Bayou, with both higher geometric means and larger standard deviations, the resulting coefficients of variation are about the same level as the low flow data. For the tributaries of Buffalo Bayou and Whiteoak Bayou, the high flow data do not seem to have consistently higher coefficients of variation than the low flow data.



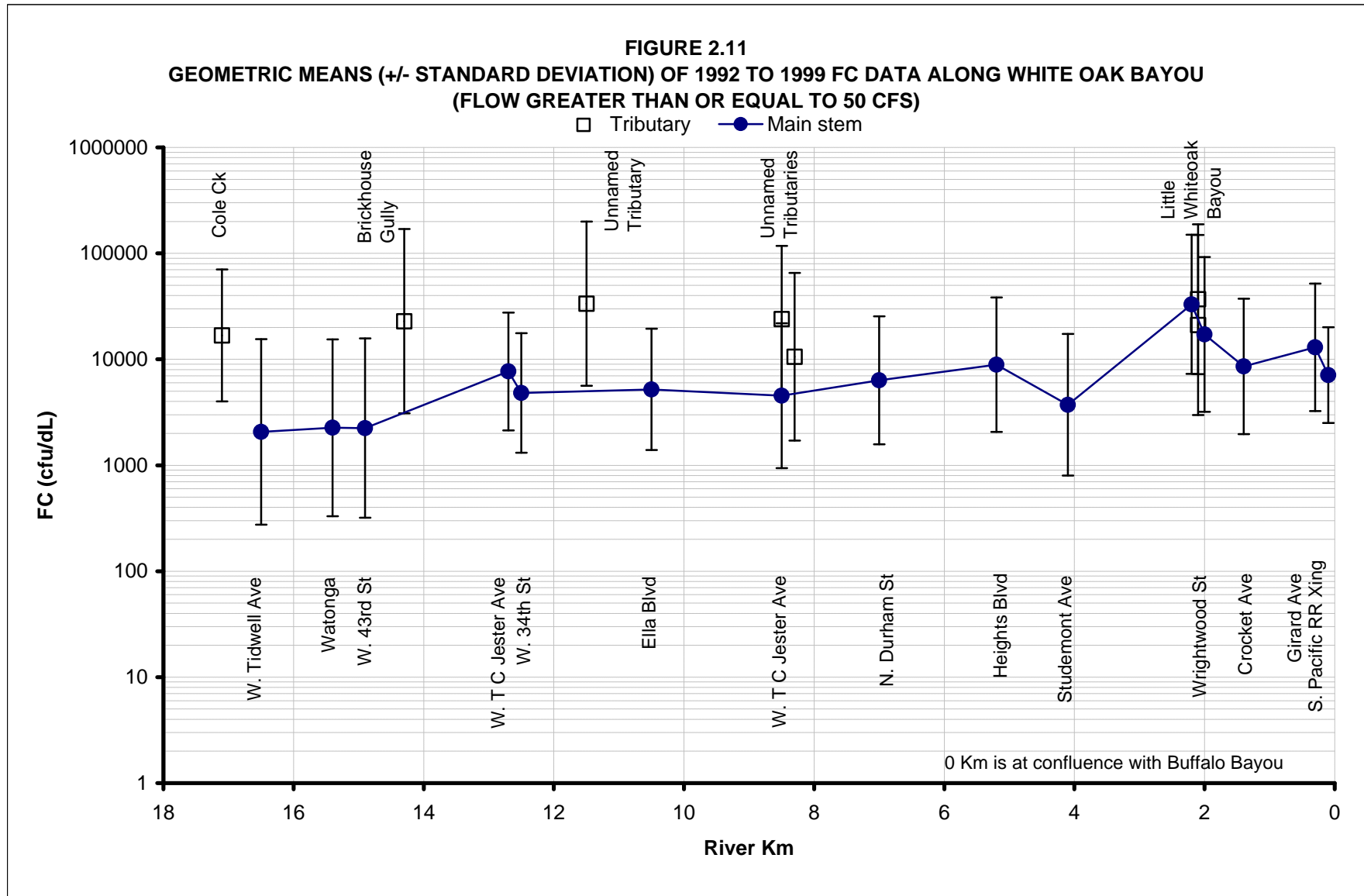


TABLE 2.7
COEFFICIENTS OF VARIATION OF FC DATA

Station ID	Location	River Km	Low flow data ¹				High flow data ²			
			Number	logGM ³	logStdev ⁴	C _V ⁵	Number	logGM ³	logStdev ⁴	C _V ⁵
Buffalo Bayou										
11142	Barker Dam	45.3	85	2.68	0.58	0.22	85	3.22	0.89	0.28
11142b	Below Barker Dam	45.1	20	2.84	0.43	0.15	12	2.88	0.45	0.15
11364	SH 6	45.0	71	2.69	0.56	0.21	46	2.69	0.62	0.23
11363	Eldridge Rd	42.4	45	2.76	0.50	0.18	26	2.88	0.74	0.26
11362	Dairy Ashford Rd	40.2	76	3.14	0.61	0.20	47	3.08	0.81	0.26
11361	Wilcrest Dr	36.7	43	3.21	0.51	0.16	24	3.12	0.66	0.21
11360	West Belt	34.6	127	3.33	0.68	0.20	115	3.36	0.86	0.26
11359	Gessner Dr	31.5	54	3.17	0.49	0.15	34	3.03	0.74	0.25
15846	Briar Forest Ave	29.7	56	3.06	0.51	0.17	34	2.98	0.69	0.23
11358	Piney Point Rd	28.9	7	3.33	0.64	0.19	4	3.52	1.18	0.34
11357	San Felipe St	25.3	53	3.11	0.51	0.17	33	3.16	0.71	0.22
11356	Voss Rd	23.5	73	3.38	0.76	0.22	81	3.67	0.86	0.23
15845	Chimney Rock Rd	18.2	57	3.10	0.58	0.19	36	3.23	0.62	0.19
11354	Woodway Dr	15.7	55	3.15	0.55	0.17	38	3.19	0.66	0.21
11353	IH 610	14.2	55	3.09	0.54	0.17	37	3.16	0.62	0.20
15844	Westcott Ave	8.7	37	3.14	0.66	0.21	25	3.31	0.68	0.20
11351	Shepherd Dr	7.0	184	3.52	0.61	0.17	161	3.60	0.72	0.20
15843	Sabine Ave	3.8	56	3.50	0.59	0.17	37	3.34	0.68	0.20
11347	Main St	1.7	72	3.71	0.60	0.16	77	4.01	0.70	0.17
15842	San Jacinto Ave	1.5	8	3.68	0.49	0.13	9	3.60	0.53	0.15
11345	McKee St	0.6	84	3.45	0.69	0.20	51	3.71	0.68	0.18
Tributaries of Buffalo Bayou										
11163	South Mayde Creek at Memorial Dr	42.7	74	2.62	0.52	0.20	57	2.92	0.74	0.25
15847	Turkey Creek at Memorial Dr	42.3	71	2.87	0.70	0.24	57	3.31	0.76	0.23
11188	Rummel Creek at Memorial Dr	34.6	27	3.30	0.84	0.26	27	3.67	0.90	0.25
16591	Spring Branch Ck at Long Point Rd	18.7	22	3.42	0.90	0.26	30	3.43	0.87	0.25
16592	Spring Branch Ck at Wirt Rd	18.7	13	3.27	0.84	0.26	6	3.62	0.92	0.25
90007 ⁶	Proetzls Creek at Long Point Rd	18.7	13	3.43	0.86	0.25	17	3.93	0.83	0.21
90013 ⁶	Spring Branch Creek at Chimney Rock Rd	18.7	11	4.15	0.95	0.23	24	4.42	0.60	0.13
16597	Neimans Bayou at Memorial Dr	17.9	26	3.61	0.97	0.27	29	4.14	0.87	0.21
90012 ⁶	Woods Bayou at Memorial Dr	17.9	4	4.78	0.50	0.10	15	4.09	0.73	0.18
16675	Unnamed tributary at Glenwood Cemetary Rd	4.5	22	4.37	0.73	0.17	29	4.12	0.82	0.20
White Oak Bayou										
11398	Jones Rd	35.3	11	2.60	0.62	0.24	6	3.38	0.92	0.27
15831	W. Tidwell Ave	16.5	44	3.12	0.52	0.17	29	3.31	0.88	0.26
15830	Watonga	15.4	45	3.18	0.67	0.21	29	3.35	0.84	0.25
15829	W. 43rd St	14.9	38	3.10	0.61	0.20	26	3.35	0.85	0.25
16637	W. T C Jester Ave (nr W. 34th St)	12.7	8	3.61	0.61	0.17	2	3.89	0.56	0.14
11390	W. 34th St	12.5	47	3.42	0.60	0.17	27	3.68	0.56	0.15
11391	Ella Blvd	10.5	41	3.53	0.57	0.16	28	3.72	0.57	0.15
15828	W. T C Jester Ave (nr W. 12th St)	8.5	28	3.55	0.60	0.17	21	3.66	0.68	0.19
15827	N. Durham St	7.0	48	3.72	0.68	0.18	32	3.80	0.60	0.16
11387	Heights Blvd	5.2	108	3.56	0.59	0.17	95	3.95	0.63	0.16
15826	Studemont Ave	4.1	53	3.61	0.67	0.19	36	3.57	0.67	0.19
11388	Houston Ave	2.2	0				3	4.52	0.66	0.15
11385	Wrightwood St	2.0	35	3.57	0.64	0.18	31	4.24	0.73	0.17
15825	Crocket Ave	1.4	41	3.93	0.51	0.13	23	3.93	0.64	0.16
15824	Girard Ave	0.3	77	3.91	0.63	0.16	46	4.11	0.60	0.15
16647	S. Pacific RR Crossing	0.1	12	3.67	0.60	0.16	5	3.85	0.45	0.12
16646	Confluence with Buffalo Bayou	0.0	3	3.41	0.46	0.13	0			
Tributaries of White Oak Bayou										
16593	Cole Creek at Bolivia Blvd	17.1	21	3.13	0.67	0.21	25	4.23	0.62	0.15
16594	Brickhouse Gully at US290	14.3	20	3.62	0.74	0.21	26	4.36	0.87	0.20
16595	Unnamed tributary at US290	11.5	20	4.47	0.74	0.17	25	4.53	0.77	0.17
93151 ⁶	Unnamed tributary at Wynwood	8.5	13	3.43	0.35	0.10	18	4.38	0.69	0.16
16596	Unnamed tributary at W. 14th St	8.3	6	4.08	0.86	0.21	6	4.02	0.79	0.20
11148	Little White Oak Bayou at Trimble St	2.1	84	4.45	0.65	0.15	68	4.57	0.71	0.15
16636	Little White Oak Bayou at Maufred	2.1	9	3.60	0.70	0.20	0			
16648	Little White Oak Bayou at White Oak Dr	2.1	10	3.49	0.60	0.17	22	4.32	0.85	0.20

¹ For Buffalo Bayou, flow at USGS gage no. 08073600 < 100 cfs.

For White Oak Bayou, flow at USGS gage no. 08074500 < 50 cfs.

² For Buffalo Bayou, flow at USGS gage no. 08073600 >= 100 cfs.

For White Oak Bayou, flow at USGS gage no. 08074500 >= 50 cfs.

³ Log of geometric mean, i.e. average of log data.⁴ Standard deviation of log data.⁵ Coefficient of variation = LogStdev/LogGM.⁶ These stations do not have TNRCC Station ID.

Table 2.8 shows the geometric means of the FC data collected on days where the flow was above the screening levels approximating the 90th percentile values from 1992 to 1999. The number of data at each station is relatively small so that only overall geometric means for the main stem and tributaries of each bayou are presented. With this high flow screening level, the overall geometric mean of Buffalo Bayou is slightly less than most of the geometric means for the low flow data of the individual stations. On the other hand, the overall geometric mean of Whiteoak Bayou is higher than most of the geometric means for the low flow data of the individual stations. For both bayous, the bacteria levels in the tributaries are higher than that in the main stem.

A further analysis of high flow data was undertaken to determine differences, if any, when compared to low flow data. High-flow data were also analyzed on a station-by-station basis to evaluate if the data exhibit temporal trends and to compare these data sets with those for moderate-flow conditions. Figures 2.12 and 2.13 show time series plots of FC data at high flows for each station in the main stem on Buffalo Bayou and Whiteoak Bayou, respectively. The data shown are samples from all agencies collected at high flow, i.e. between 100 and 1,000 cfs for Buffalo Bayou and between 50 and 300 cfs for Whiteoak Bayou.

Visual inspection of the time series plots indicates that for most of the stations, there does not appear to be a trend in the data since 1992. Statistical testing, however, was performed to confirm this observation. The results are shown in Table 2.9. The null hypothesis of zero slope in the temporal trend is rejected at the 95% confidence level at 7 stations (out of 20) on Buffalo Bayou and 3 stations (out of 14) on Whiteoak Bayou. The slopes of the data for 7 of these 10 stations are positive, indicating that bacteria levels at

TABLE 2.8
1992 TO 1999 FC DATA COLLECTED AT FLOW ABOVE 90TH PERCENTILE ¹

	Number of data	Geometric Mean (cfu/dL)	Stdev of log data
<i>Buffal Bayou</i>			
Main stem	298	997	0.84
Tributaries	94	2997	1.05
<i>White Oak Bayou</i>			
Main stem	67	9711	0.63
Tributaries	47	36372	0.67

¹ Screening levels are 1000 cfs for Buffalo Bayou and 300 cfs for White Oak Bayou. These are approximately the 90th percentiles.

FIGURE 2.12
TIME SERIES OF BUFFALO BAYOU FC DATA AT HIGH FLOW (100<Q<1000)

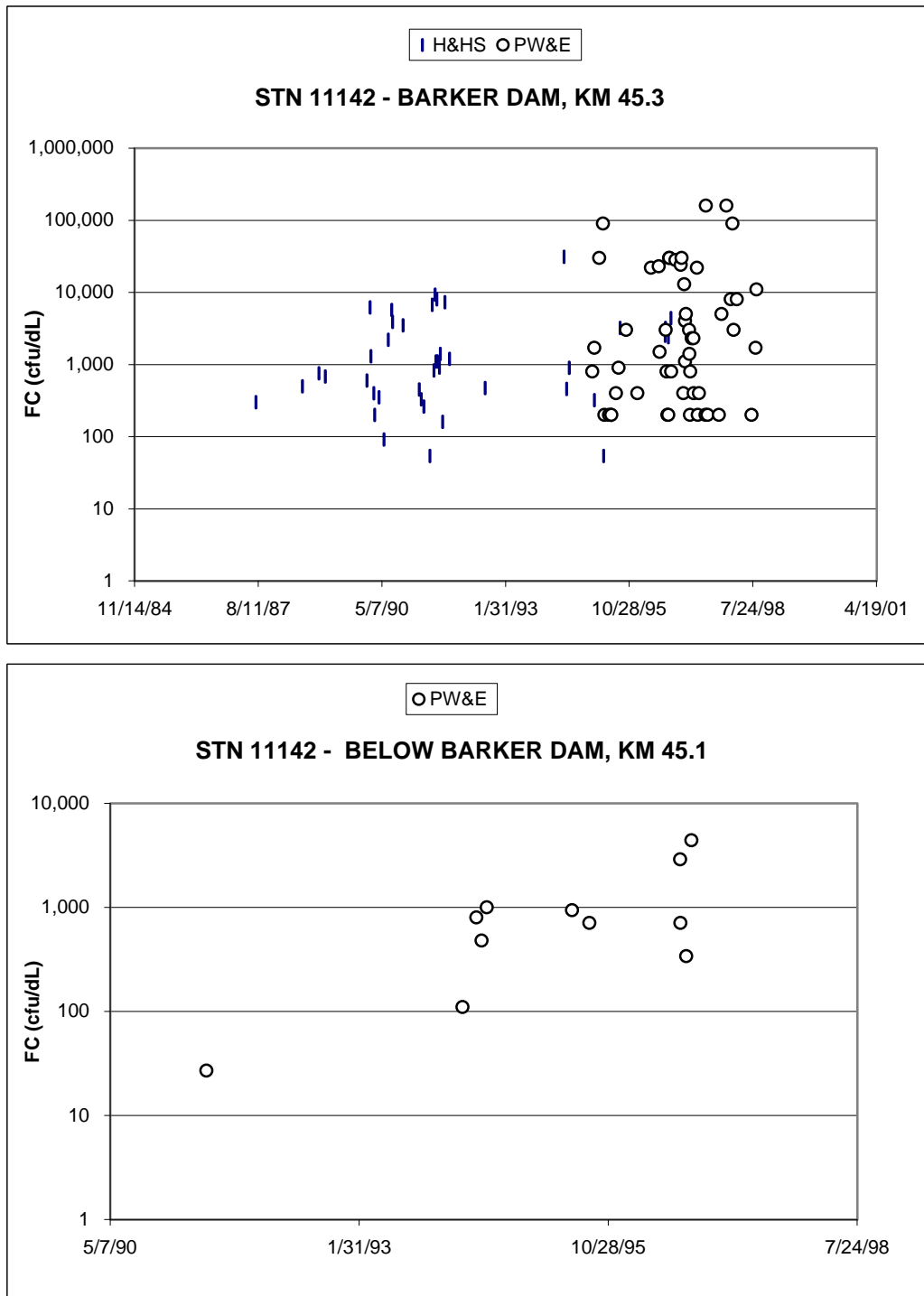


FIGURE 2.12
TIME SERIES OF BUFFALO BAYOU FC DATA AT HIGH FLOW (100<Q<1000)

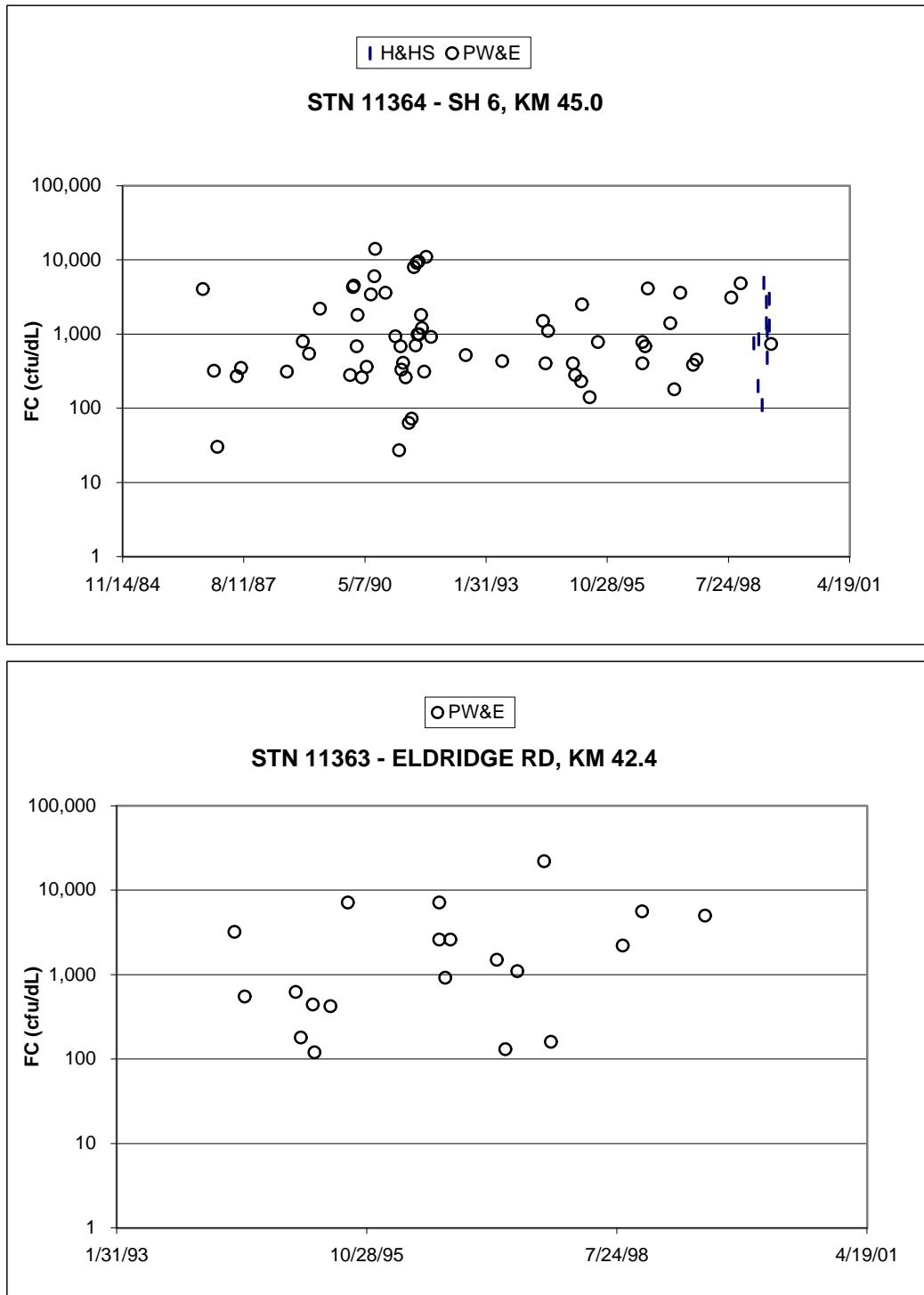


FIGURE 2.12
TIME SERIES OF BUFFALO BAYOU FC DATA AT HIGH FLOW (100<Q<1000)

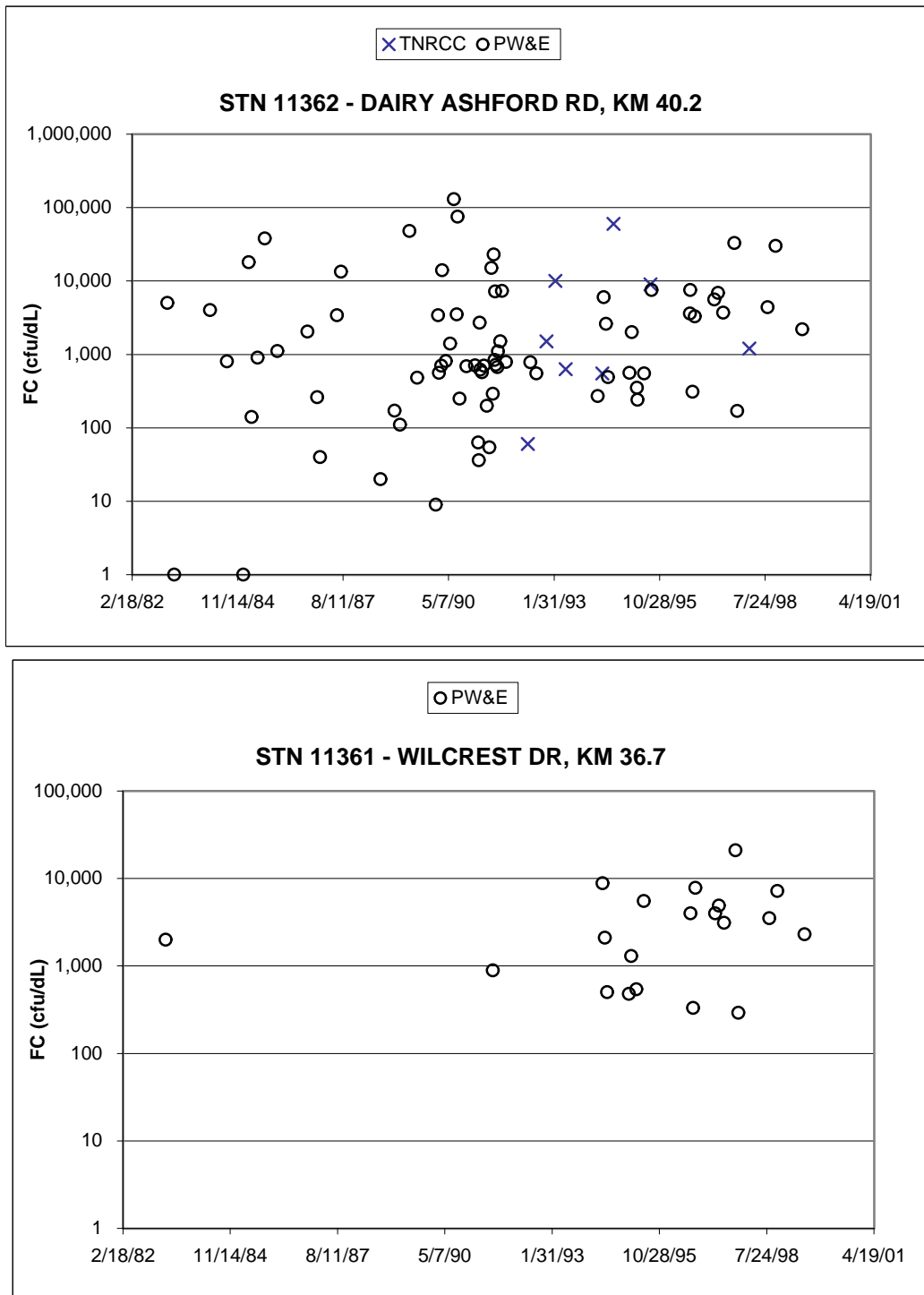


FIGURE 2.12
TIME SERIES OF BUFFALO BAYOU FC DATA AT HIGH FLOW (100<Q<1000)

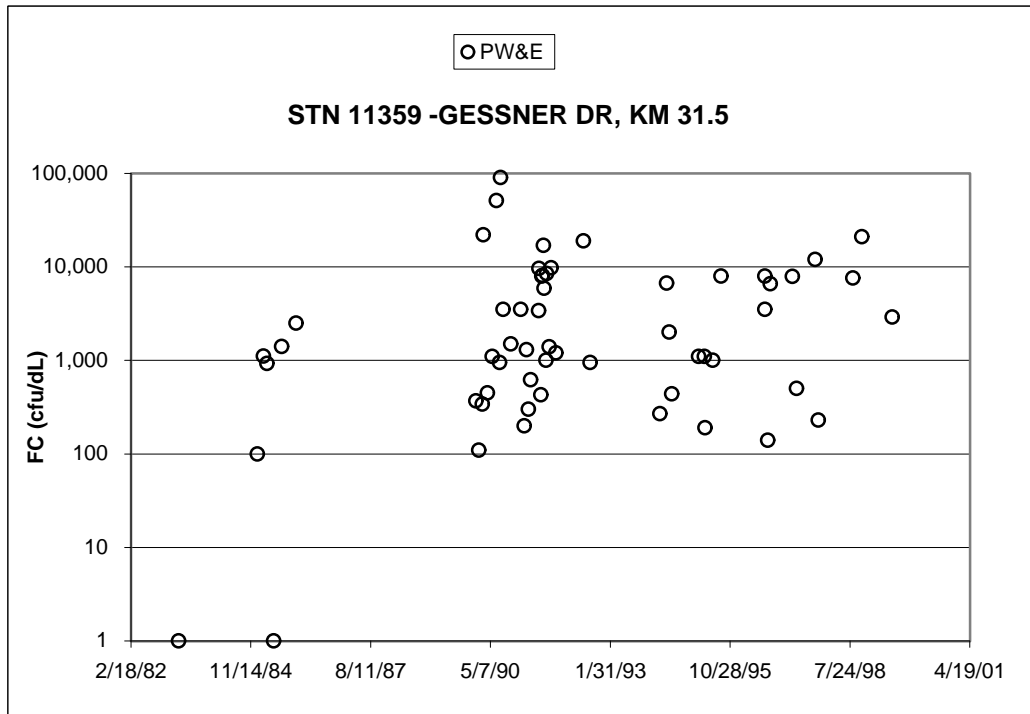
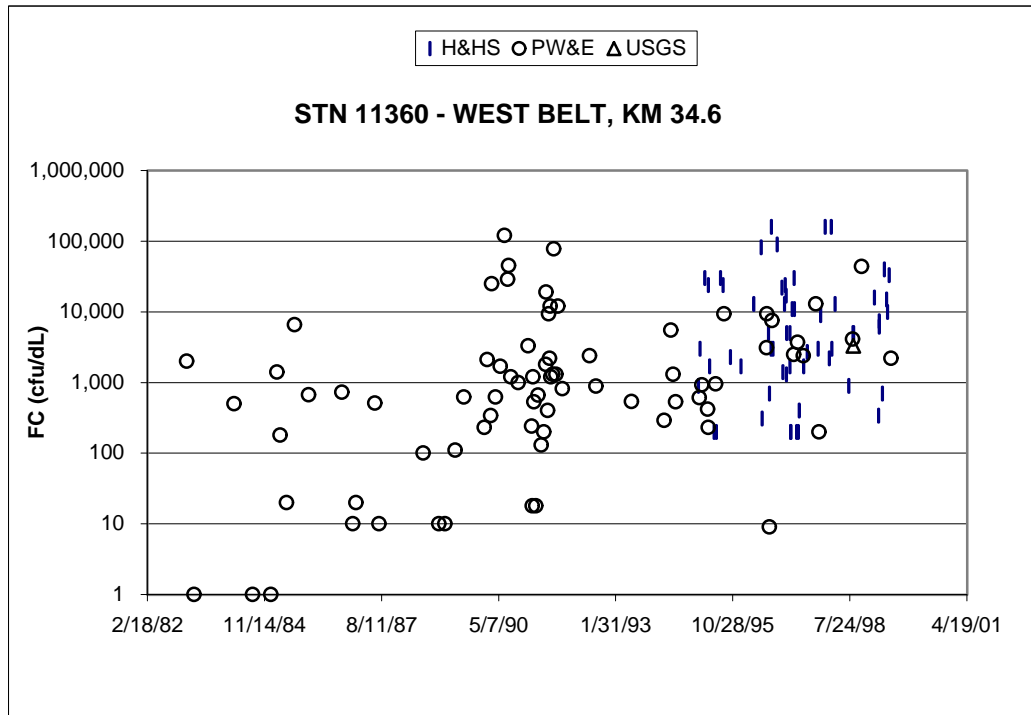


FIGURE 2.12
TIME SERIES OF BUFFALO BAYOU FC DATA AT HIGH FLOW (100<Q<1000)

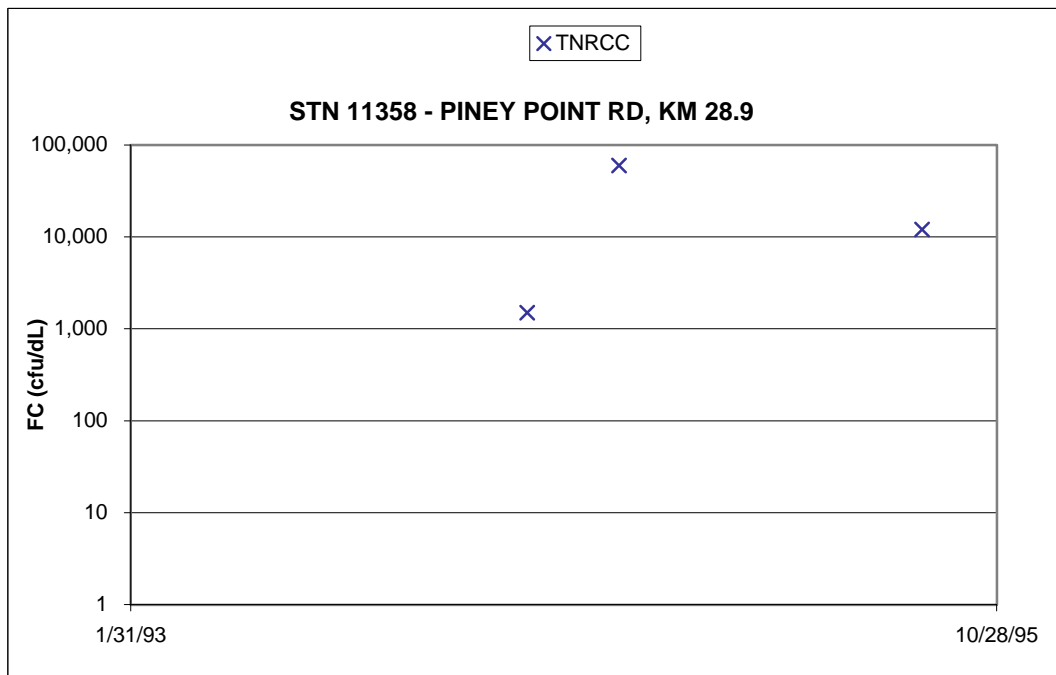
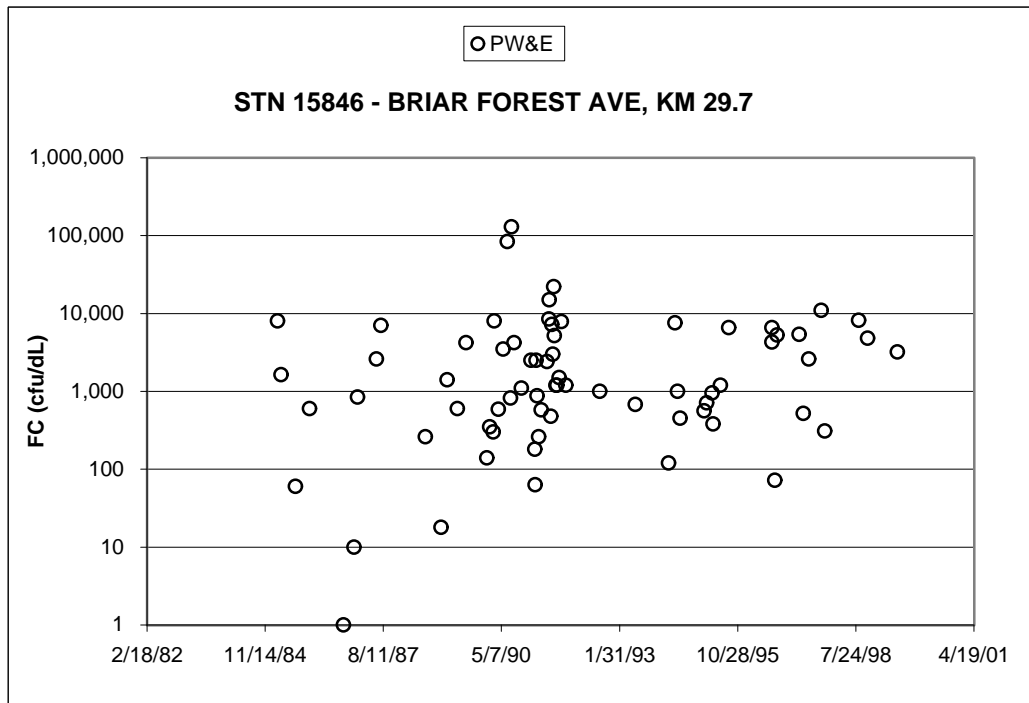


FIGURE 2.12
TIME SERIES OF BUFFALO BAYOU FC DATA AT HIGH FLOW (100<Q<1000)

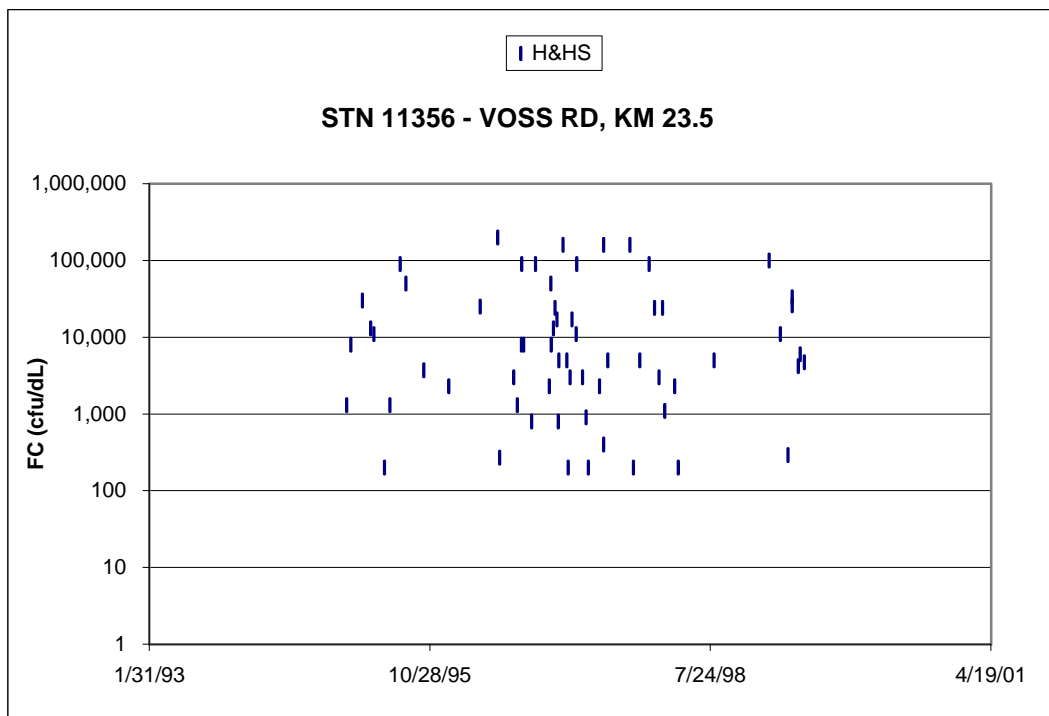
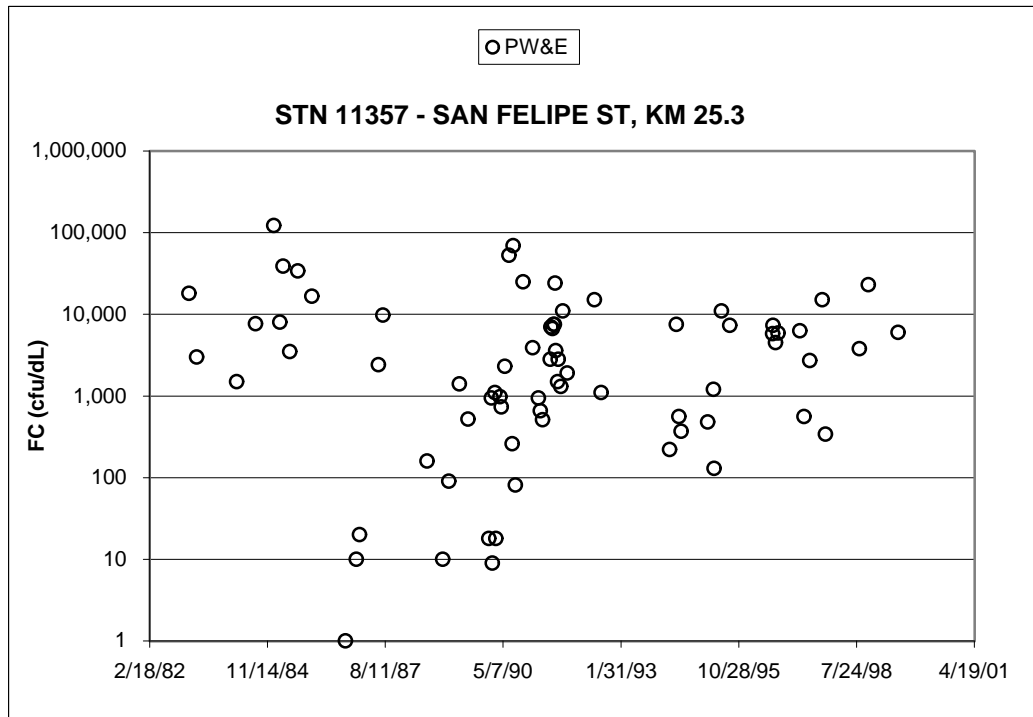


FIGURE 2.12
TIME SERIES OF BUFFALO BAYOU FC DATA AT HIGH FLOW (100<Q<1000)

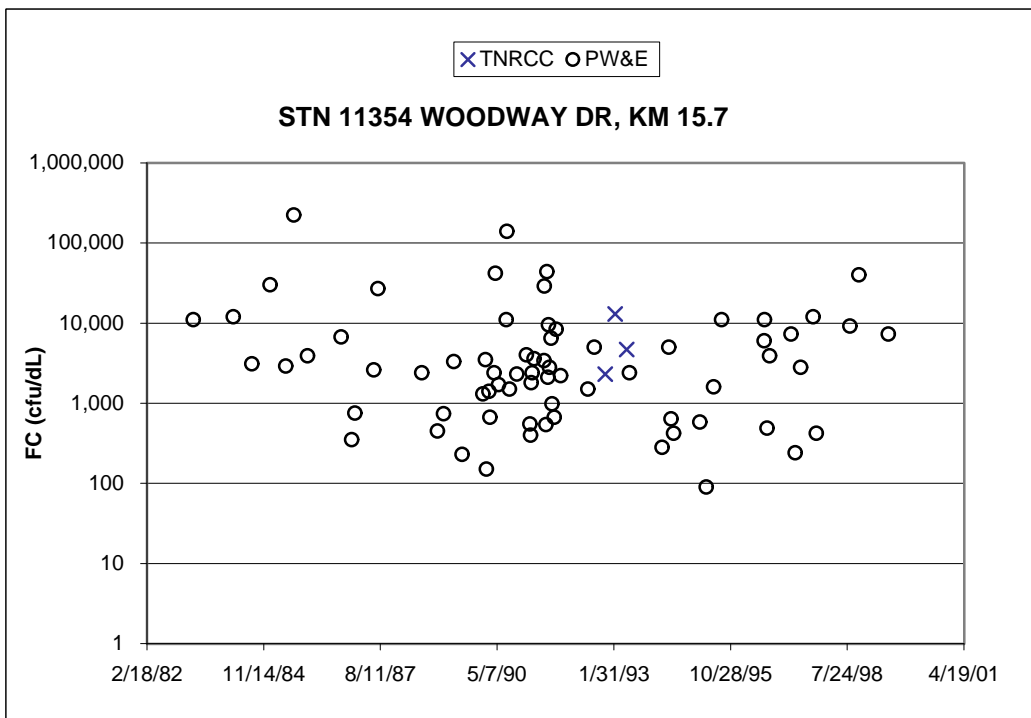
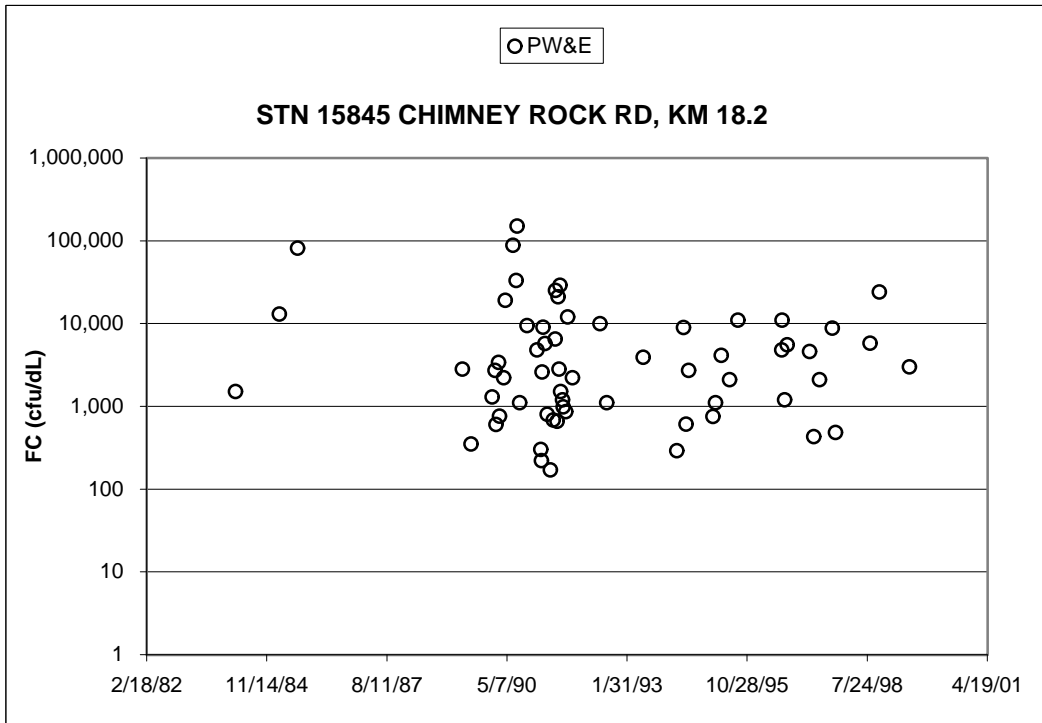


FIGURE 2.12
TIME SERIES OF BUFFALO BAYOU FC DATA AT HIGH FLOW (100<Q<1000)

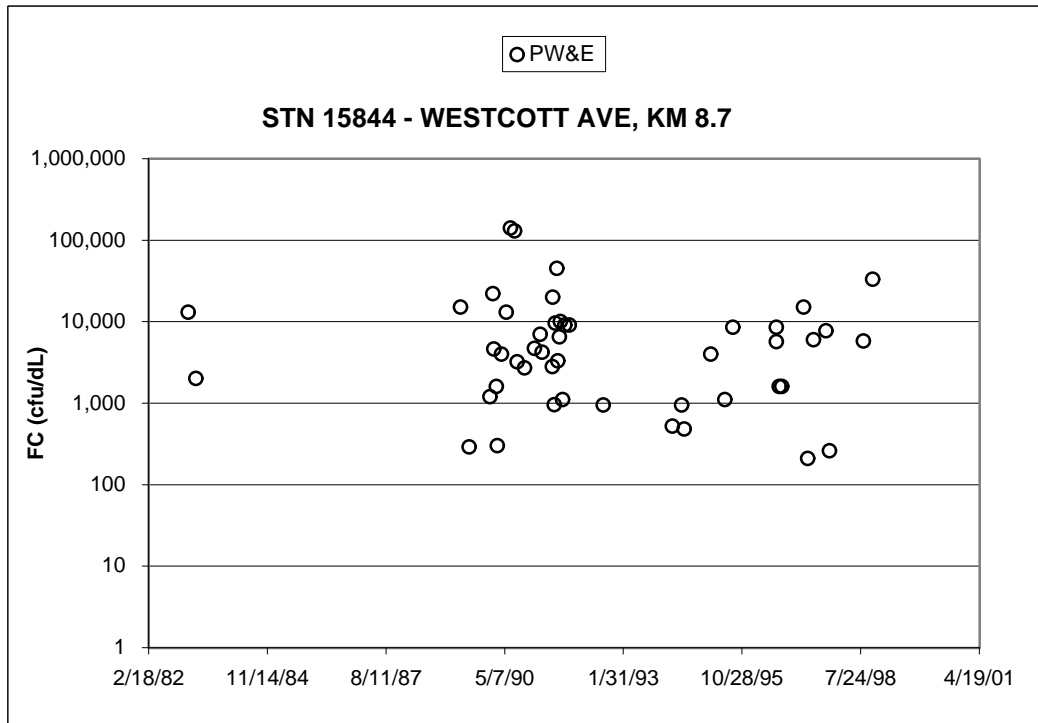
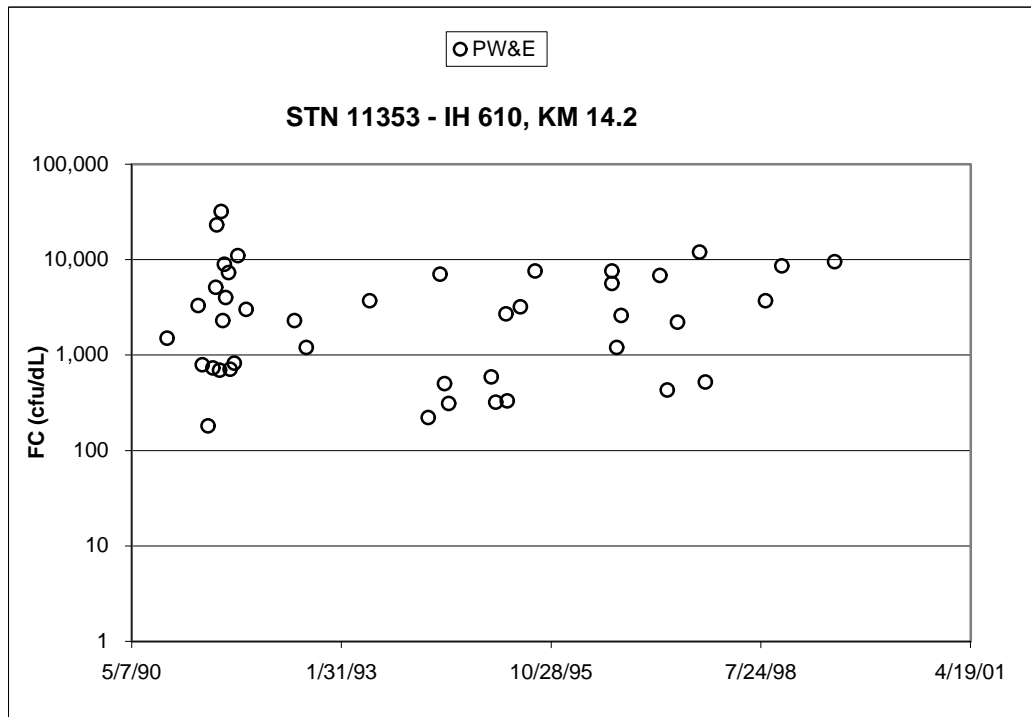


FIGURE 2.12
TIME SERIES OF BUFFALO BAYOU FC DATA AT HIGH FLOW (100<Q<1000)

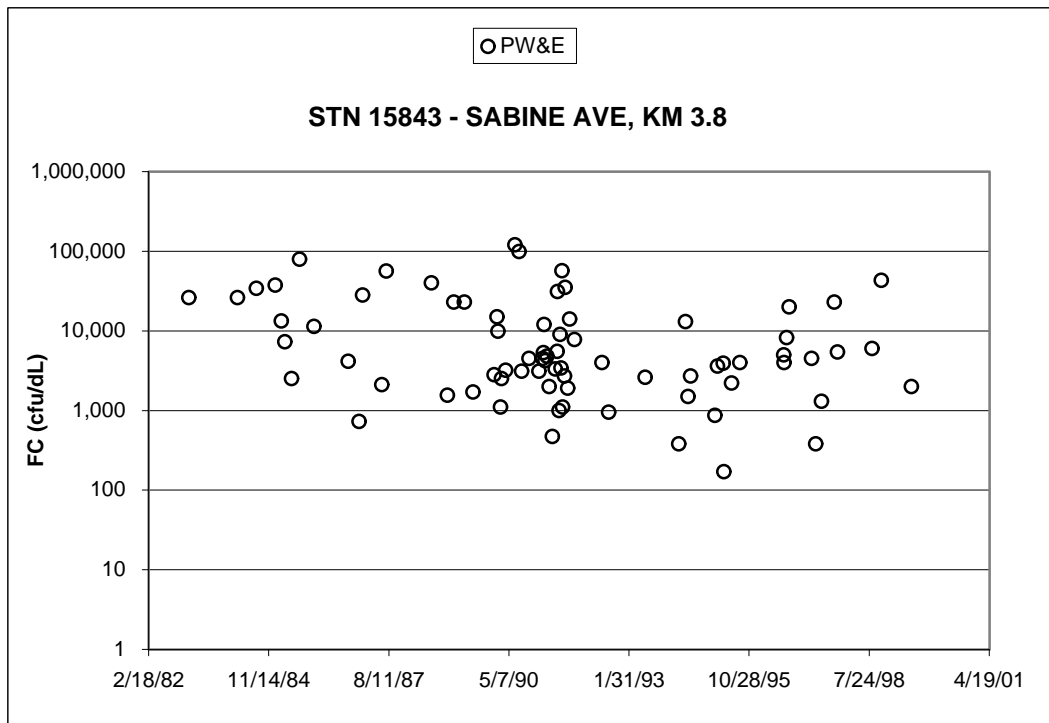
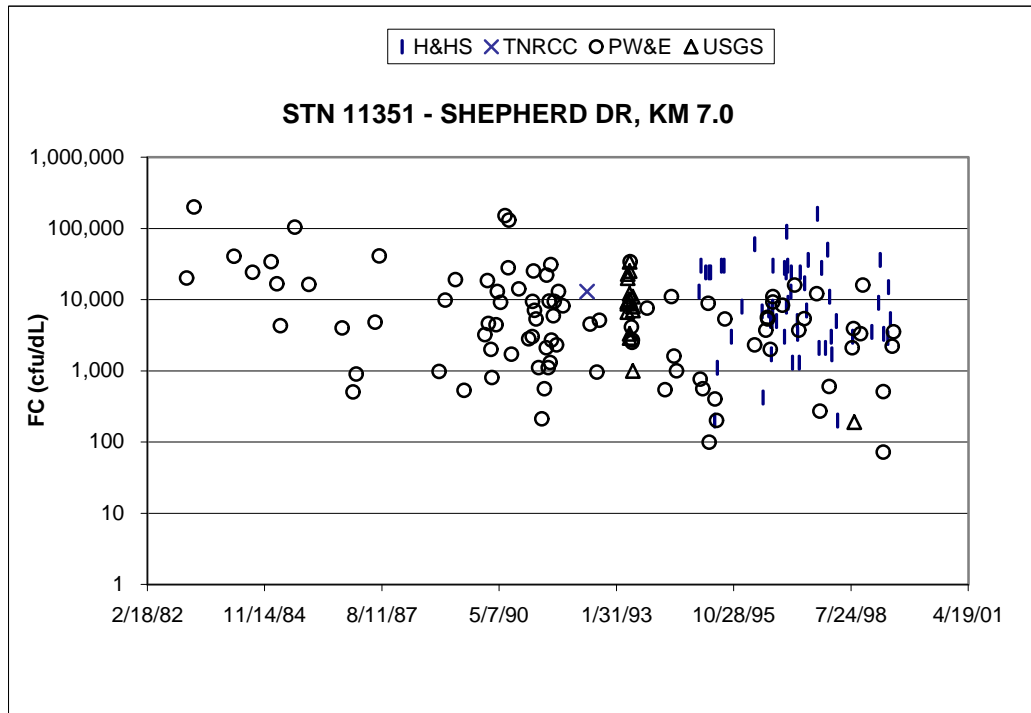


FIGURE 2.12
TIME SERIES OF BUFFALO BAYOU FC DATA AT HIGH FLOW (100<Q<1000)

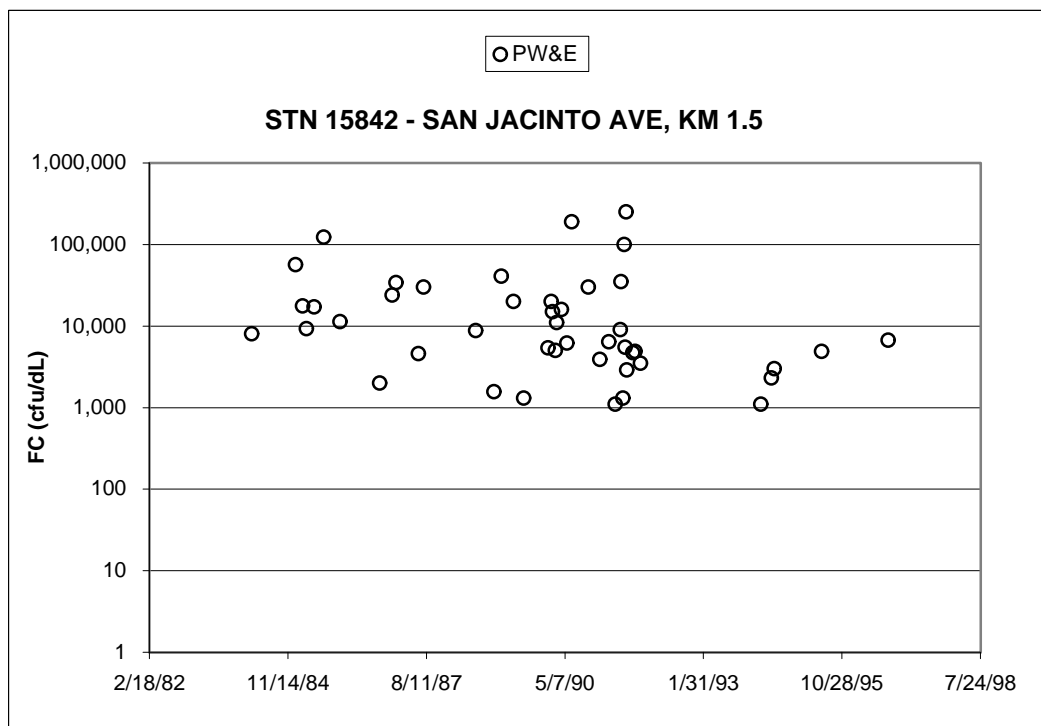
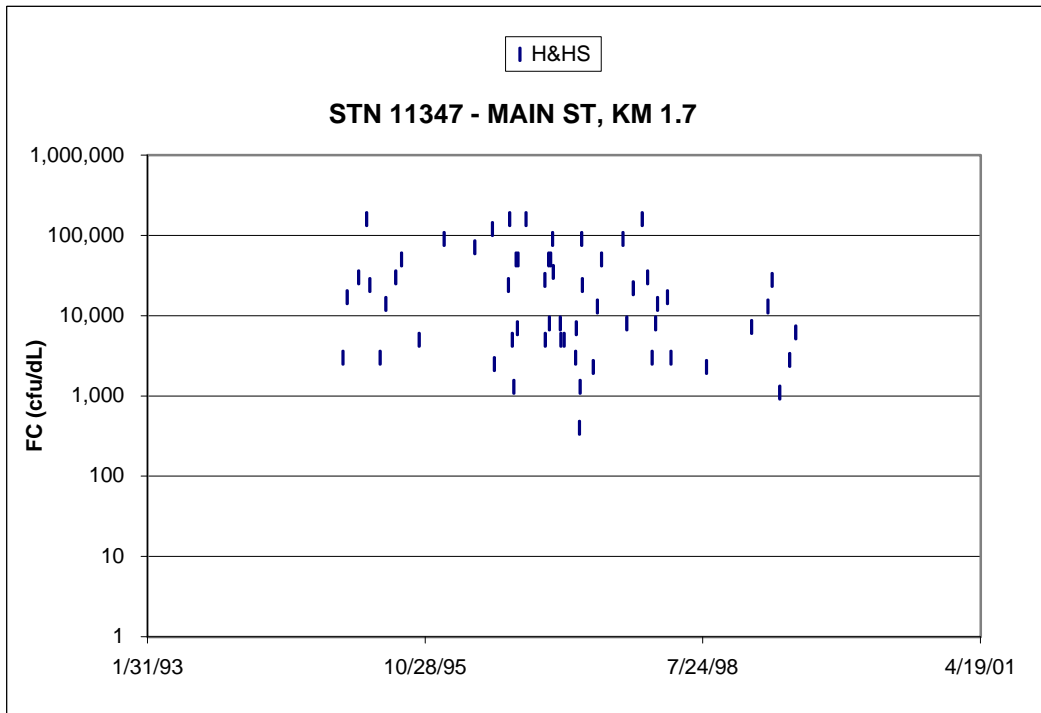


FIGURE 2.12
TIME SERIES OF BUFFALO BAYOU FC DATA AT HIGH FLOW (100<Q<1000)

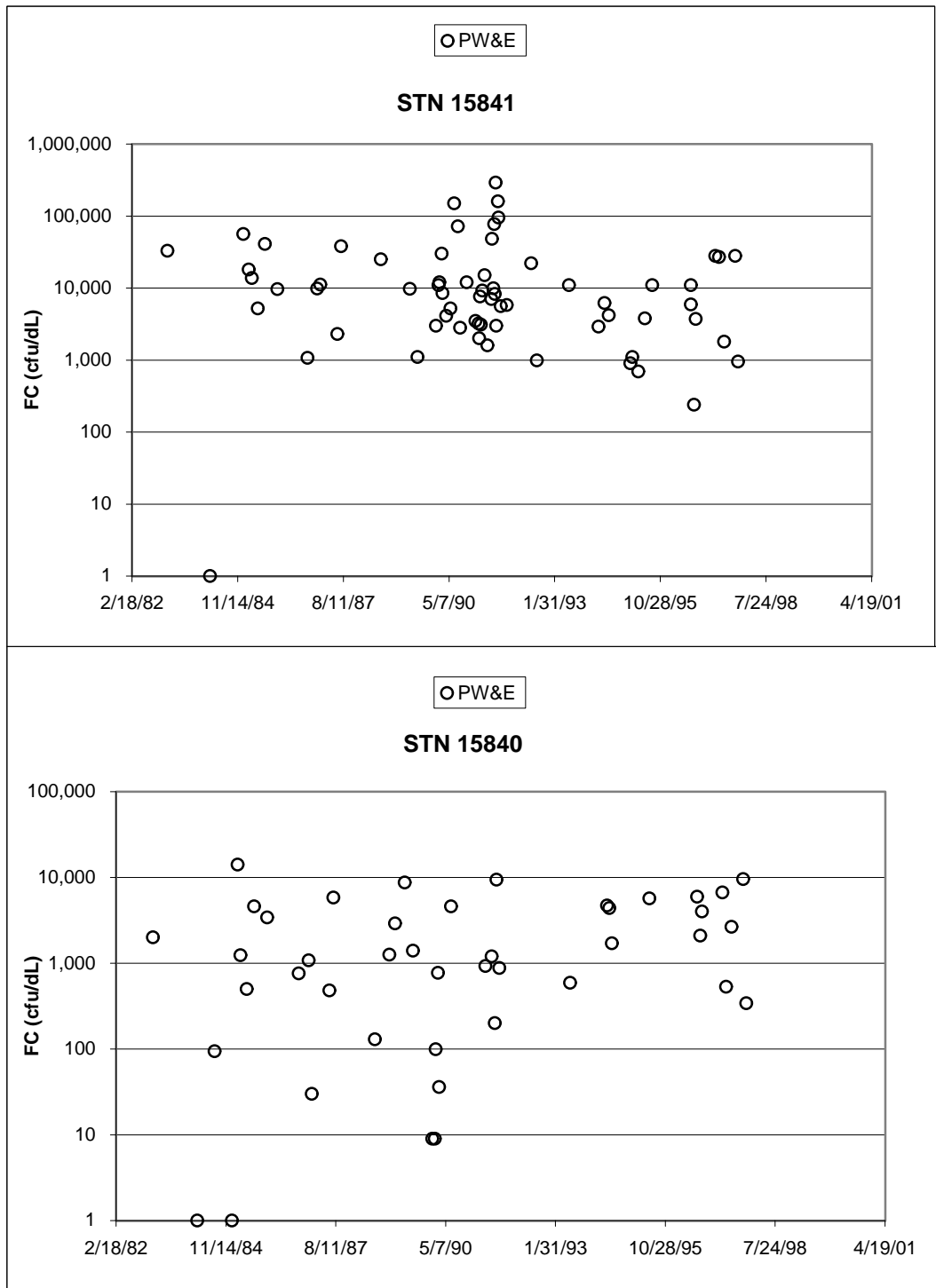


FIGURE 2.12
TIME SERIES OF BUFFALO BAYOU FC DATA AT HIGH FLOW (100<Q<1000)

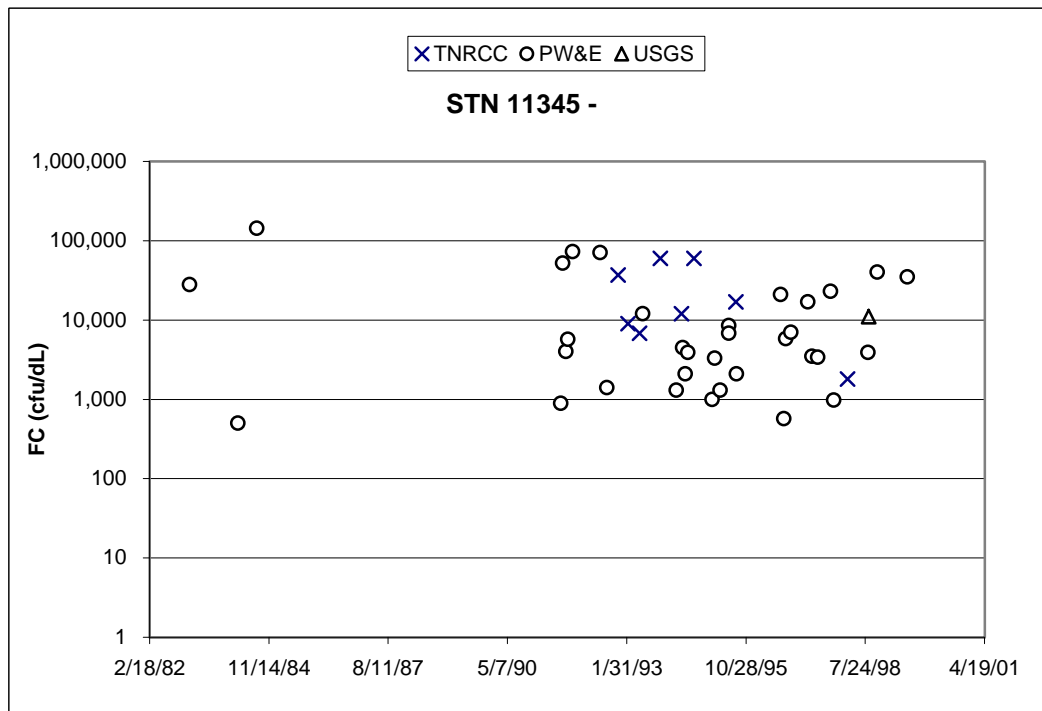


FIGURE 2.13
TIME SERIES OF WHITEOAK BAYOU FC DATA AT HIGH FLOW (50<Q<300)

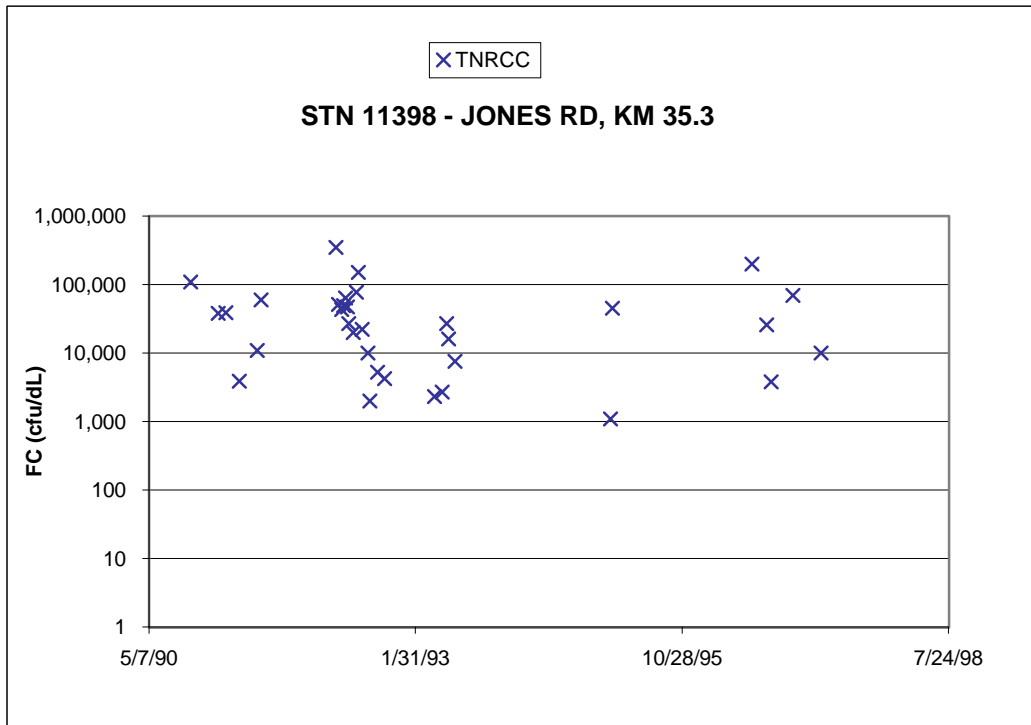


FIGURE 2.13
TIME SERIES OF WHITEOAK BAYOU FC DATA AT HIGH FLOW (50<Q<300)

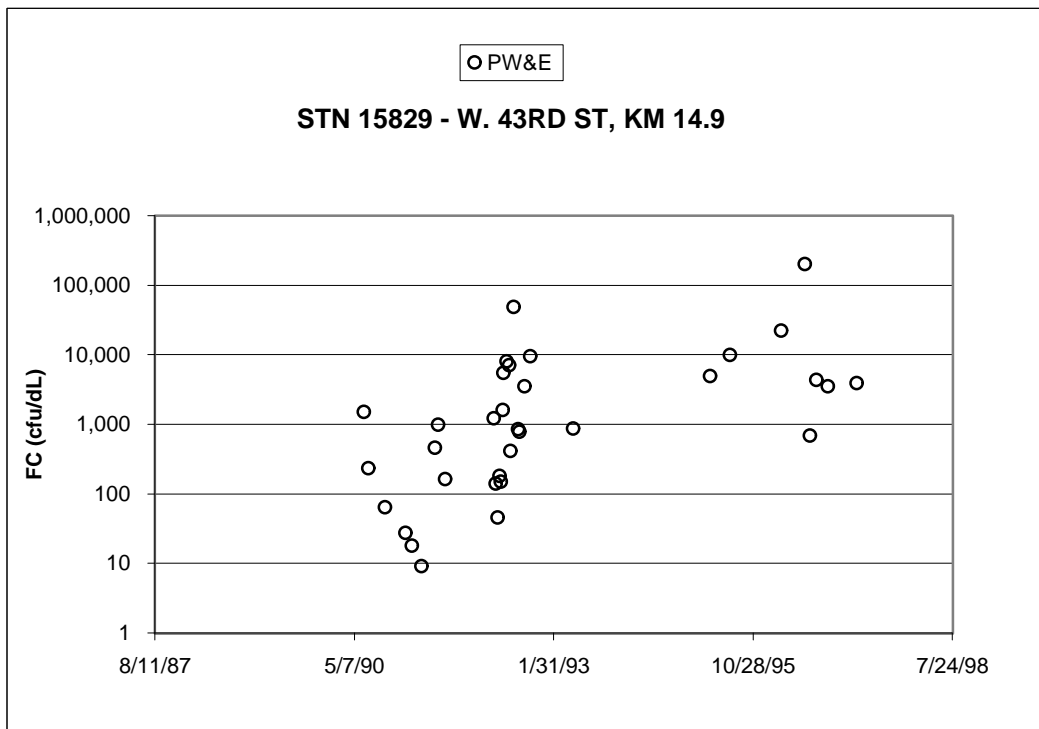
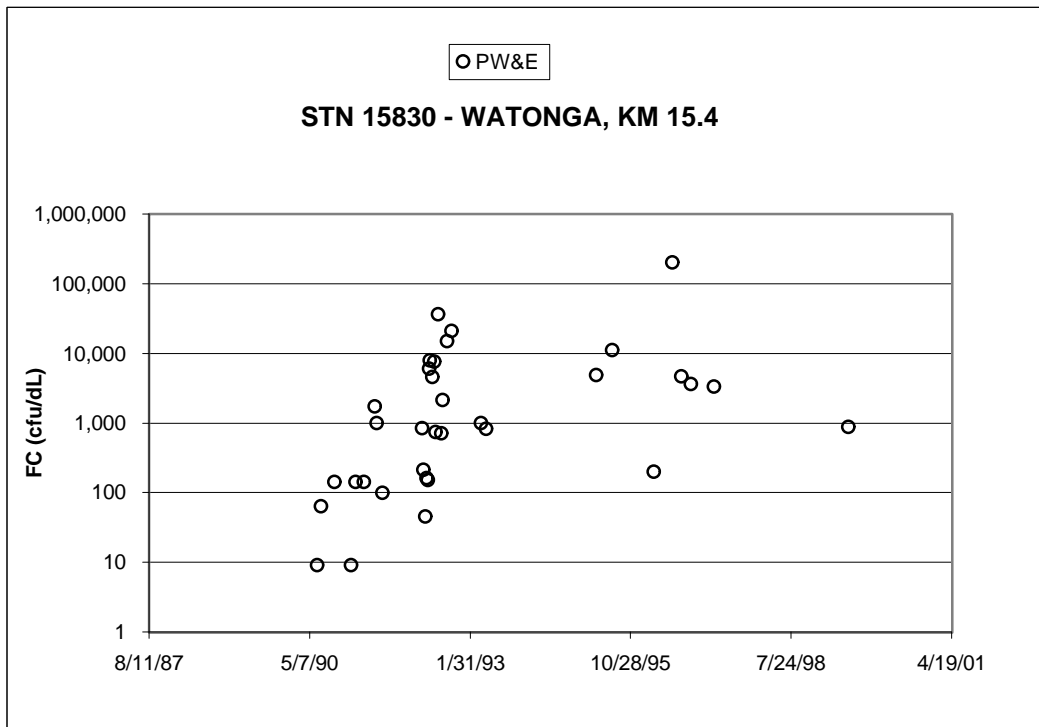


FIGURE 2.13
TIME SERIES OF WHITEOAK BAYOU FC DATA AT HIGH FLOW (50<Q<300)

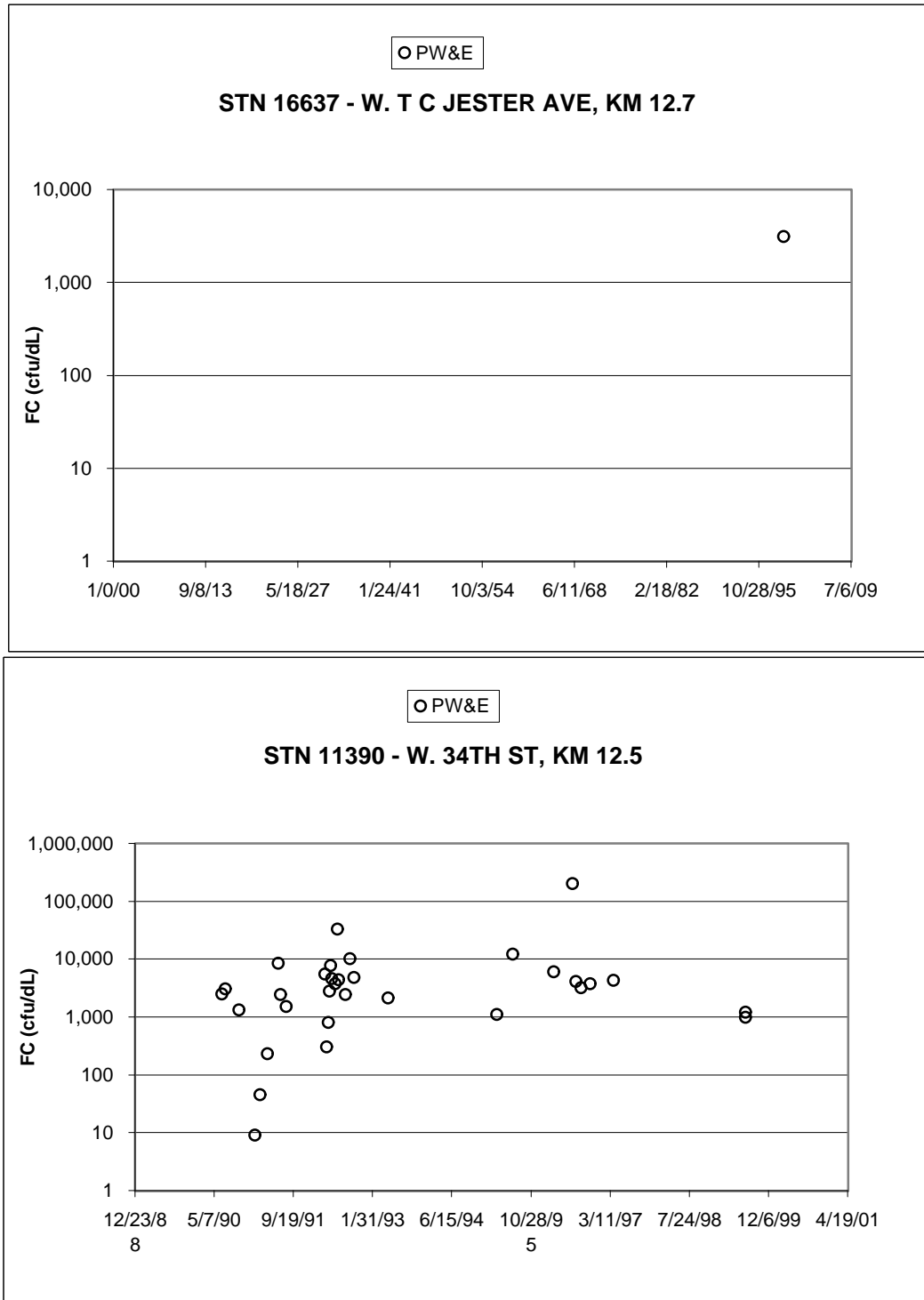


FIGURE 2.13
TIME SERIES OF WHITEOAK BAYOU FC DATA AT HIGH FLOW (50<Q<300)

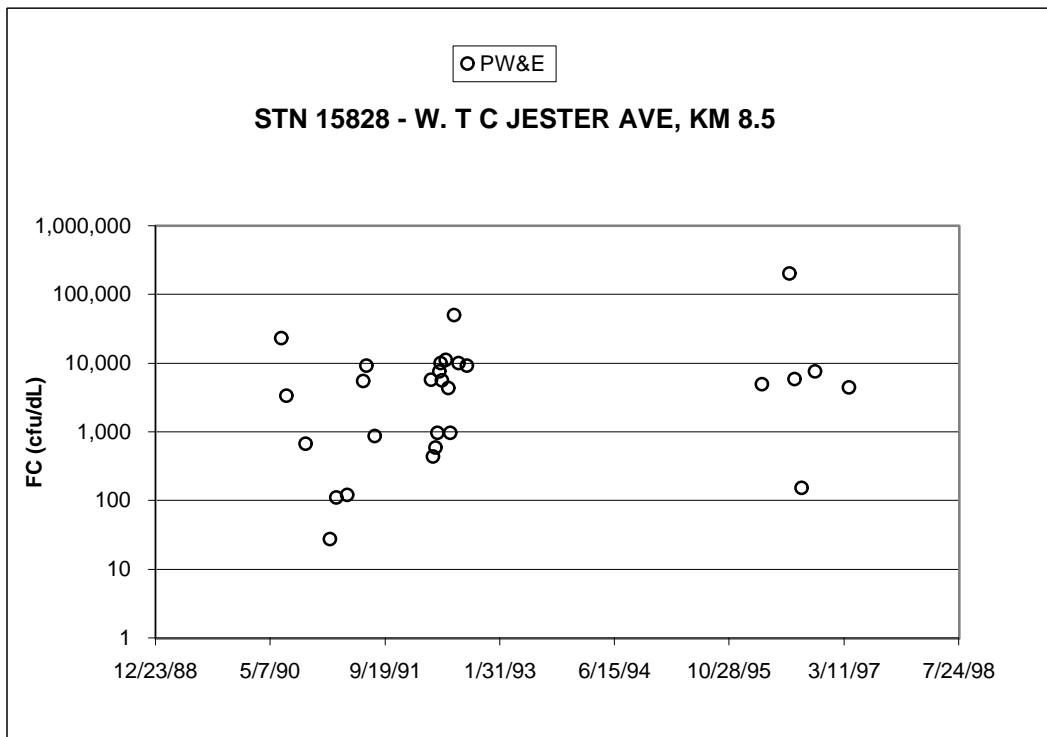
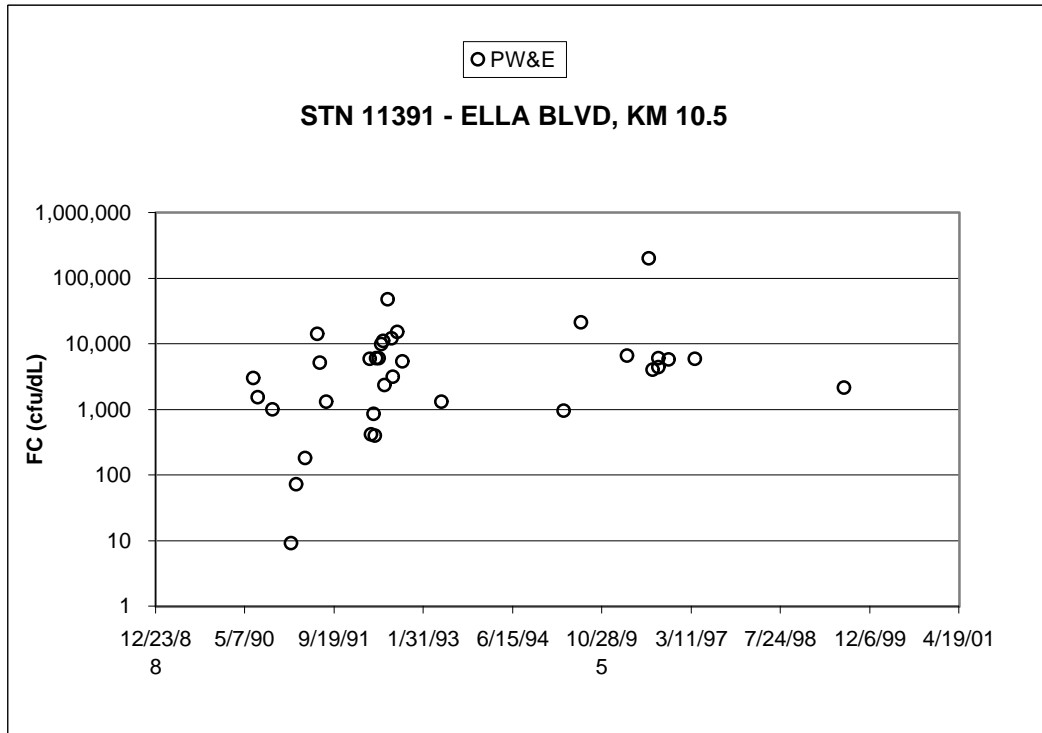


FIGURE 2.13
TIME SERIES OF WHITEOAK BAYOU FC DATA AT HIGH FLOW (50<Q<300)

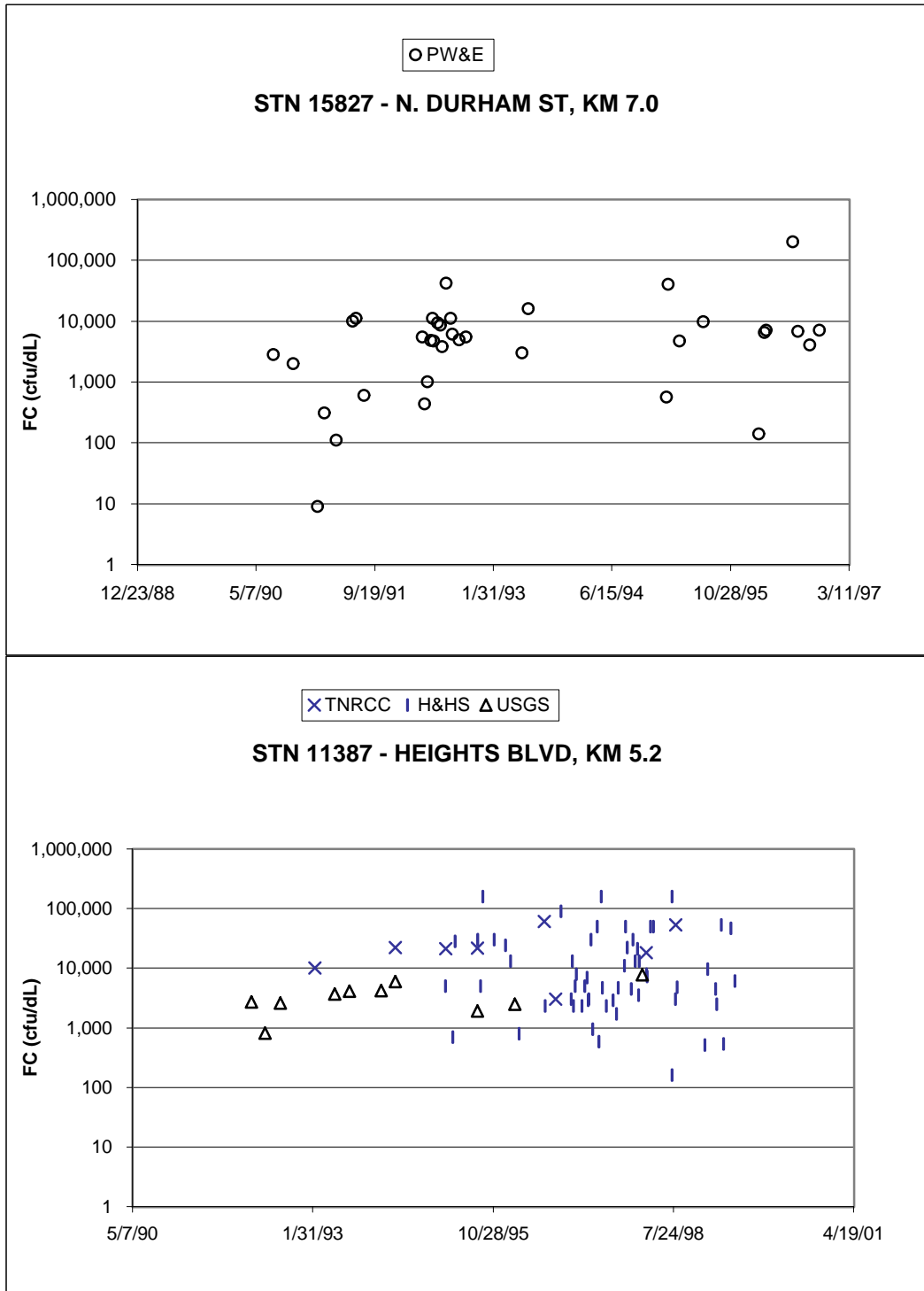


FIGURE 2.13
TIME SERIES OF WHITEOAK BAYOU FC DATA AT HIGH FLOW (50<Q<300)

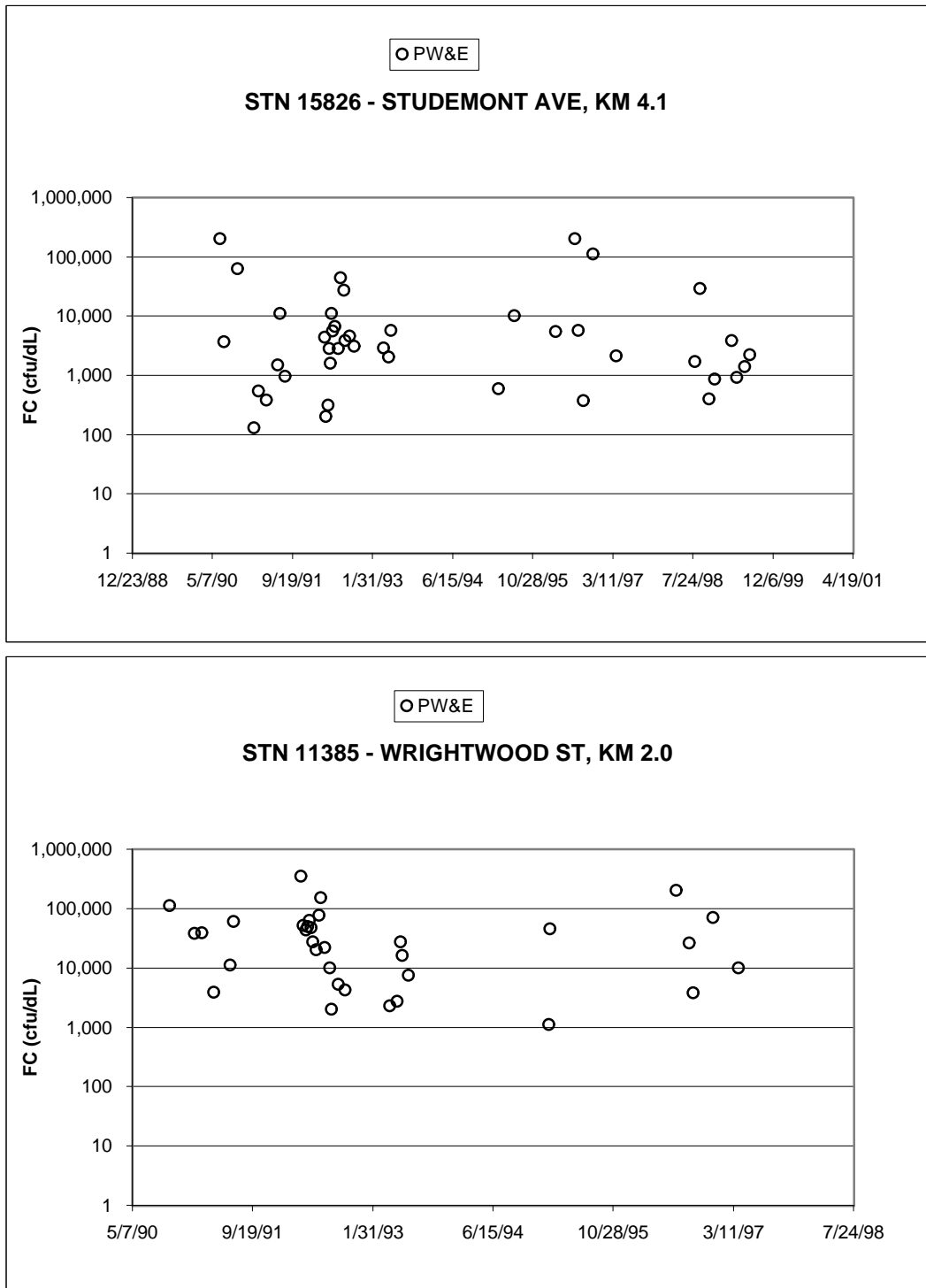


FIGURE 2.13
TIME SERIES OF WHITEOAK BAYOU FC DATA AT HIGH FLOW (50<Q<300)

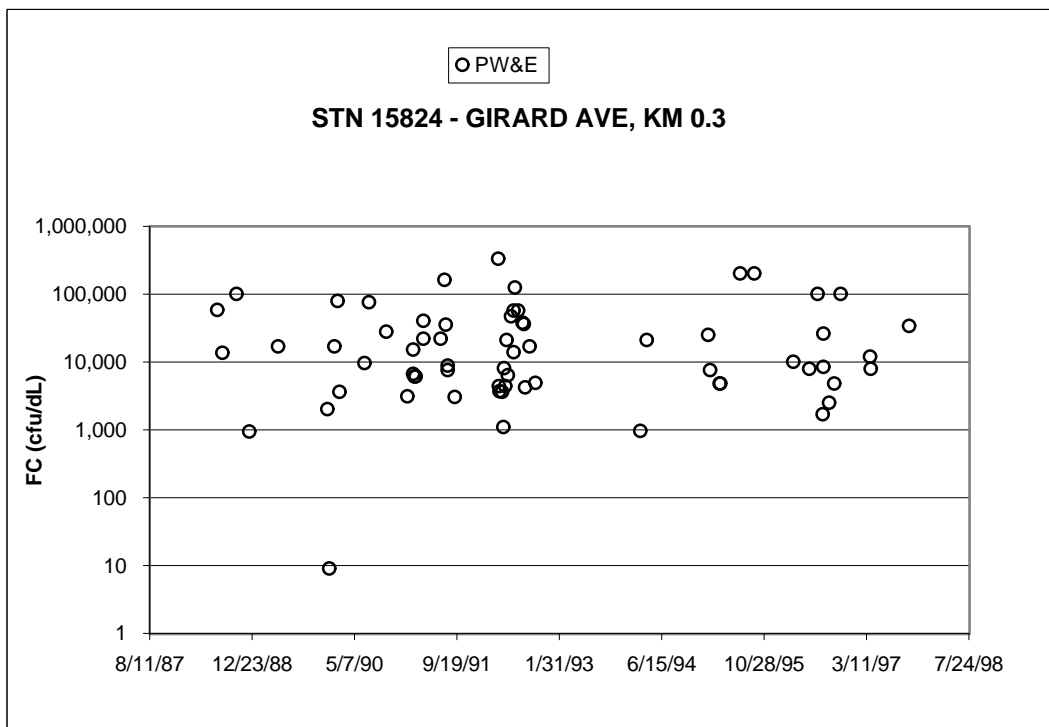
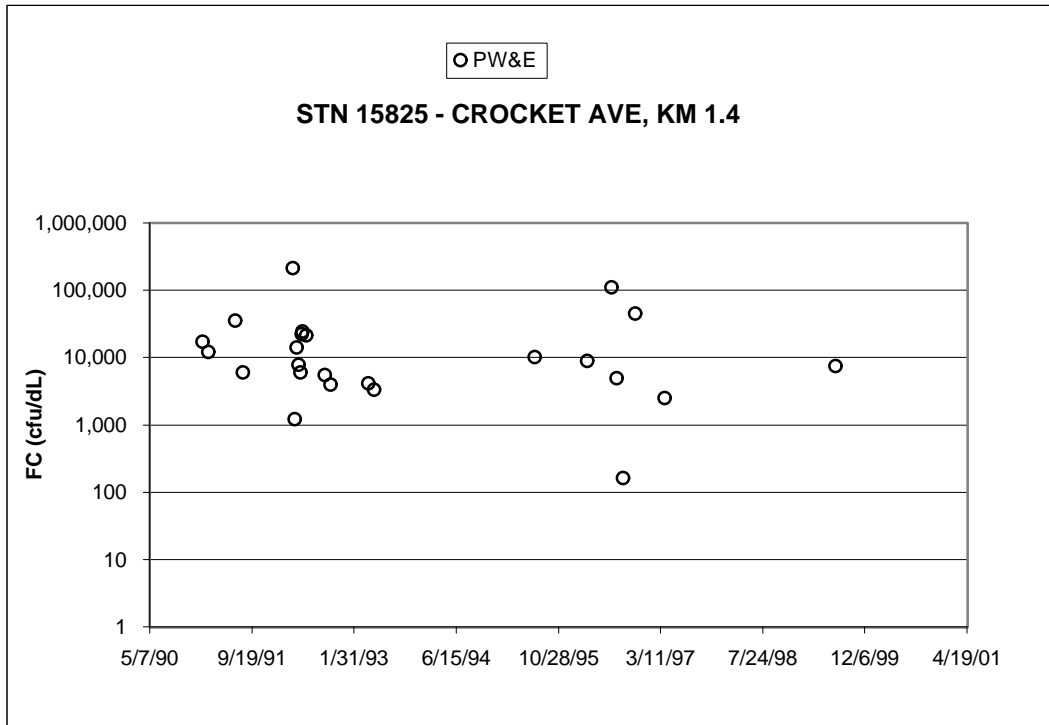


FIGURE 2.13
TIME SERIES OF WHITEOAK BAYOU FC DATA AT HIGH FLOW (50<Q<300)

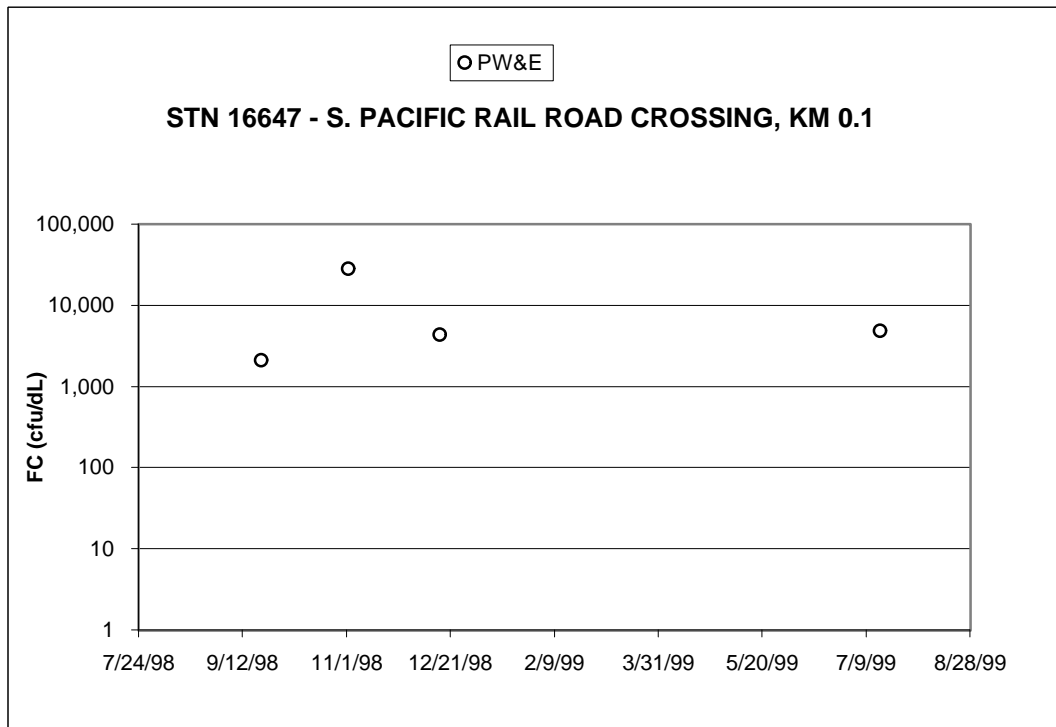


TABLE 2.9
STATISTICAL TESTS OF TRENDS IN HIGH FLOW FC DATA SINCE 1992

Station ID	Location	River km ¹	Num of data	Slope ²	P-value ³	Null hypothesis ⁴
Buffalo Bayou						
11142	Barker Dam	45.3	94	0.000195	0.009806	Accept
11142a	Barker Dam	46.3	11	0.000819	0.004157	Reject
11364	SH 6	45.0	73	0.000031	0.5304799	Accept
11363	Eldridge Rd	42.4	20	0.000437	0.1132252	Accept
11362	Dairy Ashford Rd	40.2	84	0.000171	0.0210579	Reject
11361	Wilcrest Dr	36.7	20	0.000077	0.4283258	Accept
11360	West Belt	34.6	136	0.000346	4.026E-10	Reject
11359	Gessner Dr	31.5	57	0.000247	0.0044567	Reject
15846	Briar Forest Ave	29.7	69	0.000154	0.0535205	Accept
11358	Piney Point Rd	28.9	3	0.000986	0.8106723	Accept
11357	San Felipe St	25.3	72	0.000052	0.5249048	Accept
11356	Voss Rd	23.5	62	-0.000018	0.9442713	Accept
15845	Chimney Rock Rd	18.2	62	-0.000045	0.5342534	Accept
11354	Woodway Dr	15.7	73	-0.000056	0.3432523	Accept
11353	IH 610	14.2	42	0.000040	0.6721385	Accept
15844	Westcott Ave	8.7	47	-0.000066	0.3856283	Accept
11351	Shepherd Dr	7.0	167	-0.000081	0.0249978	Reject
15843	Sabine Ave	3.8	75	-0.000134	0.0065644	Reject
11347	Main St	1.7	58	-0.000369	0.0650282	Accept
15842	San Jacinto Ave	1.5	44	-0.000174	0.0354753	Reject
11345	McKee St	0.6	42	-0.000062	0.4143361	Accept
White Oak Bayou						
11398	Jones Rd	35.3	4	0.001090	0.267321	Accept
15831	W. Tidwell Ave	16.5	34	0.000312	0.138083	Accept
15830	Watonga	15.4	34	0.000573	0.006044	Reject
15829	W. 43rd St	14.9	33	0.000789	0.000348	Reject
16637	W. T C Jester Ave (nr W. 34th St)	12.7	5	-0.000647	0.729380	Accept
11390	W. 34th St	12.5	31	0.000287	0.079971	Accept
11391	Ella Blvd	10.5	34	0.000332	0.038996	Reject
15828	W. T C Jester Ave (nr W. 12th St)	8.5	28	0.000289	0.181623	Accept
15827	N. Durham St	7.0	35	0.000356	0.062545	Accept
11387	Heights Blvd	5.2	1			
15826	Studemont Ave	4.1	42	-0.000036	0.751478	Accept
11385	Wrightwood St	2.0	33	-0.000120	0.473357	Accept
15825	Crocket Ave	1.4	24	-0.000135	0.385423	Accept
15824	Girard Ave	0.3	65	0.000060	0.550006	Accept
16647	S. Pacific RR Crossing	0.1	4	-0.000194	0.946355	Accept
16646	Confluence with Buffalo Bayou	0.0				

¹ For Buffalo Bayou, 0 km is at boundary of Segment 1013 with Segment 1007.

For White Oak Bayou, 0 km is at confluence with Buffalo Bayou.

² Slope of temporal trend is calculated with log data.

³ If P-value is less than 0.05, the null hypothesis is rejected.

⁴ Null hypothesis is that the slope of the temporal trend in the data is zero.

Null hypothesis is tested at the 95% confidence level.

⁵ Reference: Statistical Analysis for Engineers by J. Wesley Barnes, 1988.

high flows have been increasing over time. For most of the stations, the null hypothesis could not be rejected, indicating that the change in bacteria levels has not been strong in the last decade. Figure 2.14 shows a comparison of the observed trends between low and high flow data.

2.2.4 High vs Low Flow Data Analyses

Statistical analysis of the moderate- and high-flow FC datasets for selected monitoring stations showed that the two datasets were not significantly different (P values greater than 0.05), even though the geometric mean FC values for higher flows were higher than those for moderate flow (see Table 2.10).

The data analyses were expanded by looking at different flow quantiles to see if statistical differences could be found if the high flow data definition changed (i.e. the limit between moderate and high flow data was somewhere between 10th and 50th percentiles). Table 2.10 includes a summary of results for all the stations in the Buffalo and Whiteoak Bayous.

It can be observed that for Buffalo Bayou, 15 out of 20 stations showed no statistical difference ($\alpha=0.05$) between low and high flow datasets, when the limit was set to the median flow (i.e. 100 cfs). This number decreased to 13 when the limit was lowered to the flow corresponding to the 40th percentile and remained the same for the remaining flow limits (30th, 20th, and 10th percentiles). These results confirm that, overall, the high flow data are not statistically different from the low flow data in Buffalo Bayou. Stations 11142, 11345, 11347, 11356, and 11358 exhibited significant differences between the low and high flow data.

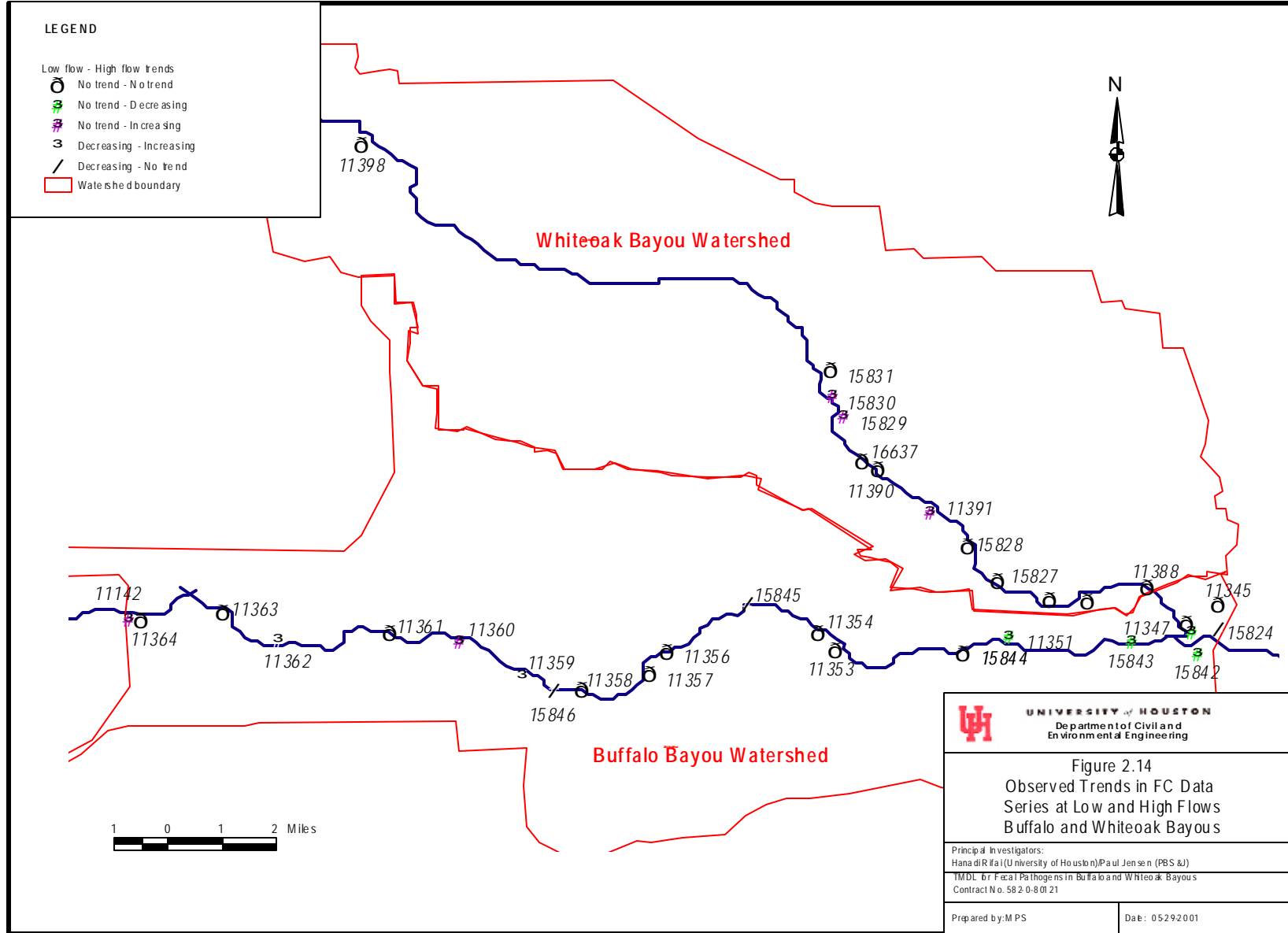


TABLE 2.10
STATISTICAL COMPARISON OF MEANS BETWEEN DATA SETS WITH DIFFERENT HIGH-FLOW
DEFINITION

Station	Date Range	<10% vs >10%			<20% vs >20%			<30% vs >30%		
		t Stat	t crit. two-tail	Null hypothesis	t Stat	t crit. two-tail	Null hypothesis	t Stat	t crit. two-tail	Null hypothesis
Buffalo Bayou										
11142	7/92-12/98	-5.19184	1.992544	Reject	-5.27246	1.976578	Reject	-5.30501	1.974272	Reject
11364	4/92-9/99	-1.70157	2.085962	Accept	-1.72535	2.000297	Accept	-1.00743	1.988269	Accept
11363	4/94-9/99	-1.57657	2.100924	Accept	-1.42996	2.004044	Accept	-0.91364	1.995468	Accept
11362	2/92-9/99	-0.10155	2.048409	Accept	-1.12636	1.98761	Accept	0.62339	1.979765	Accept
11361	4/94-9/99	1.70236	2.085962	Accept	0.388351	2.000297	Accept	1.726002	1.998969	Accept
11360	4/92-9/99	0.171707	1.992544	Accept	-0.92425	1.974622	Accept	-0.84591	1.97011	Accept
11359	4/92-9/99	0.258535	2.048409	Accept	0.32997	1.993462	Accept	1.478017	1.989688	Accept
15846	4/92-9/99	-0.16043	2.059537	Accept	0.233975	1.996009	Accept	1.375725	1.98896	Accept
11358	2/94-8/96				-3.73404	2.364623	Reject	-3.88174	2.446914	Reject
11357	4/92-9/99	-0.15588	2.100924	Accept	0.22312	2.003239	Accept	0.671695	1.990848	Accept
11356	1/95-6/99	-2.95075	2.00297	Reject	-3.38666	1.986377	Reject	-3.06229	1.979124	Reject
15845	4/92-9/99	-2.4179	2.068655	Reject	-0.79462	2.005745	Accept	-0.48304	1.986673	Accept
11354	4/92-9/99	-0.94831	2.068655	Accept	-0.07367	2.004044	Accept	0.256549	1.986377	Accept
11353	4/92-9/99	-0.60036	2.059537	Accept	0.620419	2.005745	Accept	-0.04863	1.986978	Accept
15844	5/92-12/98	-0.305155	2.02619	Accept	0.038647	2.005745	Accept	-0.37216	2.003239	Accept
11351	2/92-9/99	-1.16877	1.980625	Accept	-1.15844	1.970566	Accept	-1.69108	1.967114	Accept
15843	4/92-9/99	0.838586	2.085962	Accept	2.287609	1.997137	Reject	1.368582	1.98933	Accept
11347	1/95-6/99	-3.18721	1.997137	Reject	-3.04661	1.9858	Reject	-2.52015	1.979765	Reject
15842	4/92-9/96	3.167971	2.131451	Reject	3.167971	2.131451	Reject	0.643744	2.160368	Accept
11345	2/92-9/99	-1.54354	2.048409	Accept	-2.59088	1.990065	Reject	-2.50806	1.978524	Reject
Whiteoak Bayou										
11398	2/92-8/96	-0.39669		Reject	0.61625	2.364623	Accept	-0.8804	2.131451	Accept
15831	4/92-9/99	-3.14726	2.04227	Reject	-0.8422	2.028091	Accept	-0.68015	2.004044	Accept
15830	4/94-9/99	-1.45089	2.131451	Accept	-1.10965	2.021075	Accept	-0.7404	2.004044	Accept
15829	4/92-9/98	-0.77514	2.262159	Accept	-1.04001	2.045231	Accept	-0.95496	2.018082	Accept
16637	2/98-9/99	0.310754	12.70615	Accept	0.310754	12.70615	Accept	0.036256	3.182449	Accept
11390	4/92-9/99	-1.46914	2.178813	Accept	-0.49964	2.039515	Accept	-0.59992	2.016691	Accept
11391	4/92-9/99	-0.60035	2.228139	Accept	-0.22993	2.051829	Accept	0.109065	2.021075	Accept
15828	4/92-5/97	-2.117233	2.178813	Accept	-0.680199	2.119905	Accept	0.017117	2.055531	Accept
15827	4/92-12/96	-1.10599	2.20986	Accept	-0.31678	2.048409	Accept	0.663585	2.024394	Accept
11387	2/92-8/99	-0.64938	2.055531	Accept	-0.53209	2.005745	Accept	-1.53971	1.982385	Accept
15826	4/92-9/99	0.046599	2.262159	Accept	-0.05882	2.055531	Accept	0.189493	2.032243	Accept
11385	4/92-5/97	-0.91323	2.570578	Accept	-3.2135	2.079614	Reject	-3.99506	2.009574	Reject
15825	4/92-9/99	-0.03094	2.306006	Accept	0.932192	2.012894	Accept	0.219589	2.012894	Accept
15824	4/92-11/97	0.392259	2.364623	Accept	0.201756	2.019542	Accept	-1.63308	1.98861	Accept
16647	2/98-9/98	-0.21387	2.776451	Accept	0.051202	2.228139	Accept	-0.74147	2.200986	Accept
16646	2/98-9/98	0.146978			0.146978			0.146978		

^a variable 1 - low-flow data; variable 2 - high-flow data

^b the null hypothesis is that the two datasets are not statistically different

The test performed was the t-test assuming unequal variances

The null hypothesis is rejected if $|t_{stat}| < t_{crit}$

The null hypothesis is tested at the 95% confidence level

TABLE 2.10
STATISTICAL COMPARISON OF MEANS BETWEEN DATA SETS WITH
DIFFERENT HIGH-FLOW DEFINITION (CONT'D)

Station	Date Range	<40% vs >40%			<50% vs >50%		
		t Stat	t crit. two-tail	Null hypothesis	t Stat	t crit. two-tail	Null hypothesis
Buffalo Bayou							
11142	7/92-12/98	-4.242175	1.9747176	Reject	-4.68796	1.976578	Reject
11364	4/92-9/99	-0.18356	1.990848	Accept	0.344429	2.001716	Accept
11363	4/94-9/99	-0.88027	2.005745	Accept	-0.72517	2.022689	Accept
11362	2/92-9/99	1.209805	1.981566	Accept	0.385491	1.990452	Accept
11361	4/94-9/99	0.772946	2.004881	Accept	0.592677	2.022689	Accept
11360	4/92-9/99	-0.43804	1.969984	Accept	-0.28159	1.971007	Accept
11359	4/92-9/99	1.336072	1.996564	Accept	0.998727	2.007582	Accept
15846	4/92-9/99	1.393344	1.996009	Accept	0.278072	2.004044	Accept
11358	2/94-8/96	-3.88174	2.446914	Reject	-6.18686	2.776451	Reject
11357	4/92-9/99	0.40118	1.995468	Accept	-0.31892	2.005745	Accept
11356	1/95-6/99	-2.86519	1.976346	Reject	-2.19616	1.975695	Reject
15845	4/92-9/99	-0.33854	1.989688	Accept	-0.95234	1.993944	Accept
11354	4/92-9/99	0.279887	1.98896	Accept	-0.27543	1.994435	Accept
11353	4/92-9/99	0.052691	1.98861	Accept	-0.056854	1.994435	Accept
15844	5/92-12/98	-0.34027	2.000997	Accept	-1.01774	2.007582	Accept
11351	2/92-9/99	-1.98661	1.96701	Reject	-1.02692	1.967524	Accept
15843	4/92-9/99	2.050698	1.990065	Reject	1.345751	1.995468	Accept
11347	1/95-6/99	-2.73726	1.976459	Reject	-2.7946	1.976346	Reject
15842	4/92-9/96	0.329286	2.131451	Accept	0.329286	2.131451	Accept
11345	2/92-9/99	-2.53948	1.978524	Reject	-2.16414	1.982385	Reject
Whiteoak Bayou							
11398	2/92-8/96	-1.28376	2.262159	Accept	-1.87543	2.306006	Accept
15831	4/92-9/99	-0.60497	1.994945	Accept	-1.07241	2.019542	Accept
15830	4/94-9/99	-0.79314	1.994945	Accept	-0.94486	2.007582	Accept
15829	4/92-9/98	-1.67254	1.999624	Accept	-1.27873	2.018082	Accept
16637	2/98-9/99	0.053183	2.306006	Accept	-0.612711	4.302656	Accept
11390	4/92-9/99	-1.74383	1.993462	Accept	-1.88302	2.002466	Accept
11391	4/92-9/99	-1.4094	1.997728	Accept	-1.32146	2.001716	Accept
15828	4/92-5/97	-0.041265	2.016691	Accept	-0.571543	2.021075	Accept
15827	4/92-12/96	-0.05508	1.992544	Accept	-0.54096	1.993462	Accept
11387	2/92-8/99	-3.65272	1.97253	Reject	-4.45761	1.972267	Reject
15826	4/92-9/99	0.51298	1.992998	Accept	0.302866	1.991675	Accept
11385	4/92-5/97	-4.4755	2.000297	Reject	-3.93897	2.000297	Reject
15825	4/92-9/99	0.27286	1.999624	Accept	-0.02404	2.024394	Accept
15824	4/92-11/97	-1.3242	1.98118	Accept	-1.76171	1.984467	Accept
16647	2/98-9/98	0.055755	2.131451	Accept	-0.68056	2.28139	Accept
16646	2/98-9/98	-0.25087					

^a variable 1 - low-flow data; variable 2 - high-flow data

^b the null hypothesis is that the two datasets are not statistically different

The test performed was the t-test assuming unequal variances

The null hypothesis is rejected if $|t_{stat}| < t_{crit}$

The null hypothesis is tested at the 95% confidence level

For Whiteoak Bayou, only two stations (11385 and 11387) showed statistically significant differences between low and high flow data when the limit was set to the median and 40th percentile. Similarly to Buffalo Bayou, Whiteoak Bayou high flow data are not statistically different from the low flow data.

In addition, a test was performed to investigate if there were a statistically significant trend in the data subsets since 1992. The results are shown in Table 2.11. The null hypothesis of zero slope in the temporal trend was rejected at the 95% confidence level at five stations on Buffalo Bayou and one station on Whiteoak Bayou for the high flow data. For the other data subsets no trend was observed with very few exceptions. The data corresponding to extreme low flow conditions (10th percentile) was totally random as indicated by zero rejections of the null hypothesis.

2.2.5 Seasonal Trends

The possible impact of seasonal variations on bacteria levels was evaluated by comparing datasets under two different scenarios: (i) dry- vs. wet-weather data, and (ii) winter vs summer data.

Dry- vs Wet-weather Data

Precipitation data for the period 1961-1990 were obtained from the National Weather Service Webpage. Averaged monthly precipitation data for Houston were used to differentiate between dry- and wet-weather data. Those months whose average values of rainfall were greater than the total average precipitation over the entire period of data

TABLE 2.11
STATISTICAL TESTS OF TRENDS FOR VARIOUS DATA SUBSETS

Station	Date Range	10%				20%				30%				40%			
		# of observation	Slope ¹	P-value ²	Null hypothesis ³	# of observation	Slope ¹	P-value ²	Null hypothesis ³	# of observation	Slope ¹	P-value ²	Null hypothesis ³	# of observation	Slope ¹	P-value ²	Null hypothesis ³
Buffalo Bayou																	
11142	7/92-12/98	33	-0.00037	0.1581764	Accept	17	-0.00011	0.650068	Accept	13	-2.40E-05	0.935823	Accept	14	-6.10E-05	0.8679012	Accept
11364	4/92-9/99	14	-1.00E-04	0.722095	Accept	14	-0.00018	0.480529	Accept	15	-0.00021	0.166459	Accept	6	0.00071	0.082976	Accept
11363	4/94-9/99	13	-0.00027	0.405151	Accept	12	-0.00014	0.716737	Accept	10	7.04E-05	0.773483	Accept	5	-7.40E-05	0.55921	Accept
11362	2/92-9/99	20	-0.00038	0.163504	Accept	18	0.00025	0.286904	Accept	18	-7.40E-05	0.670485	Accept	9	-8.40E-05	0.822522	Accept
11361	4/94-9/99	13	-0.00048	0.067711	Accept	13	4.64E-05	0.888933	Accept	8	7.59E-05	0.691578	Accept	4	-0.00034	0.455161	Accept
11360	4/92-9/99	47	-0.00031	0.137315	Accept	26	2.63E-05	0.901705	Accept	22	-8.40E-06	0.945024	Accept	19	0.000243	0.455903	Accept
11359	4/92-9/99	15	-0.00019	0.356498	Accept	14	-0.00054	0.037515	Reject	13	-5.15E-05	0.779905	Accept	7	-0.00044	0.246386	Accept
15846	4/92-9/99	15	-0.00024	0.274384	Accept	14	-0.00037	0.167346	Accept	15	-0.0002	0.19565	Accept	7	-0.0005	0.167749	Accept
11358	2/94-8/96					3	0.000171	0.743787	Accept								
11357	4/92-9/99	14	-0.00034	0.259282	Accept	14	-0.00018	0.51965	Accept	15	-2.00E-05	0.866202	Accept	5	0.000565	0.496468	Accept
11356	1/95-6/99	36	-0.0001	0.715026	Accept	9	0.000552	0.291405	Accept	11	5.71E-05	0.920031	Accept	8	0.000931	0.018264	Reject
15845	4/92-9/99	15	-0.00035	0.115666	Accept	14	-0.0004	0.215474	Accept	16	-0.00032	0.011428	Reject	7	-0.00012	0.819048	Accept
11354	4/92-9/99	15	-0.00023	0.332076	Accept	14	-0.00035	0.302365	Accept	15	-6.70E-05	0.6795	Accept	6	-0.00025	0.620195	Accept
11353	4/92-9/99	14	-0.00026	0.223646	Accept	13	0.000115	0.0733933	Accept	16	-5.80E-05	0.678795	Accept	7	-0.00011	0.859399	Accept
15844	5/92-12/98	12	8.98E-05	0.724748	Accept	13	-0.00014	0.772216	Accept	4	0.00011	0.804496	Accept	4	-0.00054	0.789416	Accept
11351	2/92-9/99	63	8.72E-05	0.445714	Accept	37	-0.00016	0.306424	Accept	38	0.00014	0.226526	Accept	23	-1.40E-05	0.927926	Accept
15843	4/92-9/99	15	0.000375	0.209349	Accept	14	0.000219	0.293039	Accept	15	-2.60E-07	0.998464	Accept	7	-0.00029	0.652911	Accept
11347	1/95-6/99	33	-0.00023	0.271231	Accept	10	-0.0005	0.395616	Accept	10	0.000113	0.833225	Accept	9	8.28E-05	0.808882	Accept
15842	4/92-9/96	2	-0.00011			2	-0.00011			5	5.17E-05	0.960976	Accept				
11345	2/92-9/99	20	-0.00025	0.35224	Accept	20	1.77E-06	0.995085	Accept	20	-0.00028	0.168307	Accept	14	-0.00044	0.151511	Accept
Whiteoak Bayou																	
11398	2/92-8/96					3	0.000666	0.43949	Accept	4	-8.10E-05	0.918693	Accept	2	0.000893		
15831	4/92-9/99	6	0.000118	0.150656	Accept	12	0.000455	0.198826	Accept	4	-0.00021	0.496655	Accept	12	-0.00043	0.056504	Accept
15830	4/94-9/99	7	-7.50E-05	0.68307	Accept	12	0.000153	0.388887	Accept	4	-0.00079	0.055991	Accept	12	-0.0002	0.397074	Accept
15829	4/92-9/98	5	-0.00015	0.500079	Accept	12	0.0003	0.50184	Accept	3	0.000787	0.063879	Accept	9	0.000104	0.549235	Accept
16637	2/98-9/99	2	-0.002882											3	0.003799	0.059584	Accept
11390	4/92-9/99	8	3.67E-05	0.849716		12	0.000155	0.723337		5	-0.00083	0.106675		13	-0.0001	0.571342	
11391	4/92-9/99	6	3.61E-07	0.998325	Accept	12	8.85E-05	0.829024	Accept	5	-0.00102	0.055874	Accept	9	4.07E-05	0.82101	Accept
15828	4/92-5/97	4	-1.05E-06	0.995943	Accept	8	0.000121	0.812805	Accept	4	-0.000298	0.597378	Accept	5	-0.000138	0.722004	Accept
15827	4/92-12/96	4	-2.70E-05	0.910379	Accept	17	0.000291	0.525766	Accept	5	-9.50E-05	0.886399	Accept	13	-0.00016	0.700917	Accept
11387	2/92-8/99	22	0.000153	0.673349	Accept	14	0.000834	0.005202	Reject	21	-0.00039	0.265759	Accept	26	-0.00018	0.204304	Accept
15826	4/92-9/99	7	8.37E-05	0.692358	Accept	13	-0.0002	0.61484	Accept	4	-0.00065	0.436737	Accept	14	0.000172	0.374763	Accept
11385	4/92-5/97	5	0.000143	0.859524	Accept	7	1.38E-05	0.966072	Accept	7	0.000331	0.15764	Accept	8	-0.00081	0.20256	Accept
15825	4/92-9/99	6	-0.00012	0.554273	Accept	12	-0.00019	0.424627	Accept	4	-0.00094	0.34905	Accept	10	-9.80E-05	0.681716	Accept
15824	4/92-11/97	7	0.000311	0.598889	Accept	22	-0.00016	0.601275	Accept	17	-9.50E-05	0.724793	Accept	14	-0.00085	0.00587	Reject
16647	2/98-9/98	4	-0.00095	0.649748	Accept	2	0.00537							2	-0.00111		
16646	2/98-9/98																

¹ Slope of temporal trend is calculated with log data.
² If P-value is less than 0.05, the null hypothesis is rejected.
³ Null hypothesis is that the slope of the temporal trend in the data is zero. Null hypothesis is tested at the 95% confidence level.
⁴ Reference: Statistical Analysis for Engineers by J. Wesley Barnes, 1988.

TABLE 2.11
STATISTICAL TESTS OF TRENDS FOR VARIUOS DATA SUBSETS

Station	Date Range	50%				>50%				75%				90%				100%			
		# of observation	Slope ¹	P-value ²	Null hypothesis ³	# of observation	Slope ¹	P-value ²	Null hypothesis ³	# of observati	Slope ¹	P-value ²	Null hypothesis ³	# of observati	Slope ¹	P-value ²	Null hypothesis ³	# of observati	Slope ¹	P-value ²	Null hypothesis ³
Buffalo Bayou																					
11142	7/92-12/98	8	-0.00041	0.258686	Accept	85	0.000383	0.077587	Accept	43	0.000231	0.488453	Accept	24	0.000654	0.104987	Accept	18	0.000685	0.127869	Accept
11364	4/92-9/99	7	0.000872	0.006527	Reject	33	0.000312	0.032525	Reject	16	0.000121	0.579959	Accept	8	0.0004	0.080432	Accept	9	0.000254	0.33793	Accept
11363	4/94-9/99	5	0.0038	0.546192	Accept	26	0.000139	0.597597	Accept	15	0.000523	0.122188	Accept	6	0.000744	0.180761	Accept	5	-0.00052	0.356173	Accept
11362	2/92-9/99	11	-0.00038	0.231599	Accept	47	0.00023	0.121694	Accept	21	0.000345	0.10311	Accept	14	0.000153	0.6266	Accept	12	0.000149	0.415627	Accept
11361	4/94-9/99	24	0.000191	0.391175	Accept	24	0.000191	0.391175	Accept	13	0.00027	1.272995	Accept	6	0.00089	0.095905	Accept	5	0.00011	0.597224	Accept
11360	4/92-9/99	13	-0.00011	0.808548	Accept	115	0.000343	0.007762	Reject	57	0.00034	0.023227	Reject	31	0.000497	0.143471	Accept	27	0.000205	0.353495	Accept
11359	4/92-9/99	5	0.00022	0.703633	Accept	34	0.000205	0.227056	Accept	17	0.000111	0.635233	Accept	6	0.0004	0.442086	Accept	11	2.77E-05	0.891623	Accept
15846	4/92-9/99	5	0.000253	0.686692	Accept	34	0.000217	0.179063	Accept	16	0.000425	0.06877	Accept	9	0.000277	0.424972	Accept	9	-0.0001	0.667127	Accept
11358	2/94-8/96	3	7.15E-05	0.650559	Accept	4	-0.00039	0.757894	Accept	2	0.000256										
11357	4/92-9/99	5	0.000137	0.692019	Accept	33	0.000232	0.155942	Accept	17	0.000201	0.442279	Accept	7	0.000592	0.197566	Accept	9	7.87E-06	0.962227	Accept
11356	1/95-6/99	9	-0.00024	0.700165	Accept	81	-7.75E-06	0.973412	Accept	46	1.38E-04	0.613855	Accept	18	-5.80E-04	0.353383	Accept	17	7.45E-04	0.162816	Accept
15845	4/92-9/99	5	-0.00046	0.62184	Accept	36	0.000204	0.137238	Accept	16	-5.00E-06	0.978064	Accept	9	0.000344	0.29891	Accept	11	0.000135	0.522903	Accept
11354	4/92-9/99	5	0.000732	0.208138	Accept	38	0.000227	0.097954	Accept	18	0.000321	0.145974	Accept	9	5.45E-05	0.885839	Accept	11	0.000177	0.236787	Accept
11353	4/92-9/99	5	0.000398	0.366313	Accept	37	0.000283	0.035552	Reject	17	0.000378	0.091438	Accept	9	0.000237	0.363785	Accept	11	0.000159	0.522733	Accept
15844	5/92-12/98	4	-0.00019	0.76356	Accept	25	0.000386	0.044885	Reject	12	0.000445	0.233921	Accept	6	0.000452	0.300842	Accept	7	0.000277	0.47879	Accept
11351	2/92-9/99	21	-0.00059	0.070937	Accept	161	-6.30E-05	0.396085	Accept	81	-1.60E-04	0.114113	Accept	41	9.95E-05	0.48131	Accept	39	-1.30E-05	0.931294	Accept
15843	4/92-9/99	5	-0.001	0.144813	Accept	36	0.000281	0.062813	Accept	17	7.74E-05	0.722844	Accept	9	0.008709	0.92501	Accept	9	0.000631	0.054697	Accept
11347	1/95-6/99	10	-0.00033	0.583807	Accept	77	-0.00044	0.019341	Reject	42	-0.00048	0.052566	Accept	20	-1.60E-05	0.961507	Accept	15	-0.00017	0.767695	Accept
15842	4/92-9/96					9	0.000184	0.64621	Accept	4	0.000503	0.049946	Reject				Reject	4	0.001398	0.401282	Accept
11345	2/92-9/99	10	-0.00021	0.673147	Accept	51	-5.70E-05	0.641305	Accept	24	-1.20E-04	0.494821	Accept	13	-5.75E-05	0.813514	Accept	14	-1.10E-04	0.635704	Accept
Whiteoak Bayou																					
11398	2/92-8/96					6	0.000434	0.648228	Accept	3	0.001896	0.346991	Accept	2	0.000555		Reject				
15831	4/92-9/99	10	-4.30E-05	0.740058	Accept	29	0.000239	0.226833	Accept	18	0.00116	0.731067	Accept	7	0.000131	0.745276	Accept	4			
15830	4/94-9/99	10	-9.20E-05	0.781776	Accept	29	0.000154	0.417704	Accept	18	0.000187	0.558049	Accept	7	-8.43E-05	0.834589	Accept	4	-9.59E-06	0.985836	Accept
15829	4/92-9/98	9	0.000236	0.454495	Accept	26	0.000559	0.015505	Reject	18	0.000427	0.119133	Accept	6	0.000552	0.383827	Accept	2	0.000946		Reject
16637	2/98-9/99	2	-0.000914			2	-0.031496														
11390	4/92-9/99	9	1.09E-05	0.959081		27	3.95E-05	0.732273	Accept	16	2.31E-05	0.899772	Accept	7	-0.000206	0.536842	Accept	4	-0.00013	0.139949	Accept
11391	4/92-9/99	9	0.000143	0.465577	Accept	28	0.000119	0.352521	Accept	19	7.72E-05	0.646871	Accept	6	-0.00014	0.744313	Accept	3	0.000103	0.191583	Accept
15828	4/92-5/97	7	0.000351	0.128735	Accept	21	8.18E-05	0.69415	Accept	14	-1.21E-04	0.604578	Accept	5	4.26E-04	0.493878	Accept	2	8.66E-05		
15827	4/92-12/96	9	0.000164	0.668631	Accept	32	8.79E-05	0.622517	Accept	20	-8.10E-05	0.725216	Accept	8	1.19E-04	0.740309	Accept	4	-7.40E-04	0.254742	Accept
11387	2/92-8/99	25	-9.70E-05	0.6652	Accept	95	9.58E-05	0.362784	Accept	50	2.89E-05	0.841301	Accept	27	1.41E-04	0.442893	Accept	18	1.06E-04	0.657136	Accept
15826	4/92-9/99	15	-3.90E-05	0.780937	Accept	36	-2.90E-05	0.797211	Accept	22	-1.30E-04	0.301116	Accept	11	-1.80E-04	0.462065	Accept	3	1.45E-04	0.67034	Accept
11385	4/92-5/97	8	-0.00034	0.365565	Accept	31	-0.00016	0.445077	Accept	21	-9.80E-05	0.690795	Accept	6	-0.00019	0.655113	Accept	4	-0.00047	0.700617	Accept
15825	4/92-9/99	9	-0.00037	0.030112	Reject	23	-0.00011	0.481957	Accept	15	-0.00047	0.065546	Accept	5	-9.20E-05	0.771549	Accept	3	-0.00018	0.516423	Accept
15824	4/92-11/97	17	-0.00023	0.079597	Accept	46	-3.70E-05	0.768767	Accept	28	-1.80E-04	0.275954	Accept	12	1.99E-04	0.472466	Accept	6	-2.00E-04	0.346658	Accept
16647	2/98-9/98	3	-0.00351	0.254777	Accept	5	0.000585	0.775638	Accept	2	0.003619			2	-0.00299						
16646	2/98-9/98																				

¹ Slope of temporal tre¹ Slope of temporal trend is calculated with log data.
² If P-value is less than² If P-value is less than 0.05, the null hypothesis is rejected.
³ Null hypothesis is tha³ Null hypothesis is that the slope of the temporal trend in the data is zero. Null hypothesis is tested at the 95% confidence level.
⁴ Reference: Statistical⁴ Reference: Statistical Analysis for Engineers by J. Wesley Barnes, 1988.

were considered “wet weather” and the remaining ones were considered “dry weather”.

The wet and dry months are shown below.

Wet	Dry
May	January
June	February
July	March
August	April
September	October
November	December

Table 2.12 includes the results of this analysis. Data in Table 2.12 show that four stations in Buffalo and three in Whiteoak exhibited statistically significant differences ($\alpha=0.05$) between dry- and wet-weather datasets. This seems to indicate that bacterial levels (wet data) in Buffalo and Whiteoak Bayous are slightly impacted by the wet weather conditions (20% of the stations showed wet data that are higher than the dry data with a 95% confidence level). These higher values may be the result of runoff and/or higher temperatures that favor microbial growth. To assess the influence of the latter, an analysis of data for two seasonal periods was conducted as presented below.

Winter vs Summer Data

Historical temperature datasets were obtained from the National Weather Service Webpage. Averaged monthly temperature data for Houston during the period 1961-1990 were used to differentiate between summer and winter data. If a month presented an averaged monthly temperature higher than the total average temperature, it was classified as a “summer” month, otherwise it was considered a “winter” month. The winter and summer months are shown below.

TABLE 2.12
STATISTICAL COMPARISON OF MEANS BETWEEN DATA SETS FOR DRY AND WET WEATHER

Station	Date Range	t Stat	t crit. two-tail	Null hypothesis	Geometric mean	
Buffalo Bayou					wet	dry
11142	7/92-12/98	-1.510493	1.976123	Accept	2.7833557	2.9406420
11364	4/92-9/99	2.712683	1.994945	Reject	2.7324311	2.3933341
11363	4/94-9/99	1.696404	2.012894	Accept	2.8630793	2.5516319
11362	2/92-9/99	0.820164	1.986086	Accept	3.0849315	2.9668956
11361	4/94-9/99	1.920563	2.006645	Accept	3.2320846	2.9650489
11360	4/92-9/99	-0.262827	1.970197	Accept	3.2355306	3.2715329
11359	4/92-9/99	1.889643	1.990848	Accept	3.1614148	2.9202952
15846	4/92-9/99	2.460429	1.988269	Reject	3.0969990	2.8155037
11358	2/94-8/96	2.360087	2.262159	Reject	2.2720810	1.8058450
11357	4/92-9/99	2.89883	1.989688	Reject	3.2225059	2.8845600
11356	1/95-6/99	-0.287017	1.975695	Accept	3.4106485	3.4624211
15845	4/92-9/99	1.500158	1.991675	Accept	3.1711918	2.9790386
11354	4/92-9/99	0.117811	1.993944	Accept	3.1223258	3.0947413
11353	4/92-9/99	1.086175	1.987291	Accept	3.1131021	3.0077205
15844	5/92-12/98	0.408694	2.000997	Accept	3.1728984	3.1147176
11351	2/92-9/99	-1.197839	1.967337	Accept	3.4574927	3.5423924
15843	4/92-9/99	-0.751411	1.988610	Accept	3.3378506	3.4459118
11347	1/95-6/99	-0.334619	1.976346	Accept	3.7901799	3.8263351
15842	4/92-9/96	-1.2170	2.178813	Accept	3.4527834	3.7557945
11345	2/92-9/99	-0.4523	1.982171	Accept	3.4562586	3.5305442
Whiteoak Bayou						
11398	2/92-8/96	2.669991	2.160368	Reject	3.0256786	2.2504311
15831	4/92-9/99	3.142662	2.004881	Reject	3.3045001	2.8115988
15830	4/94-9/99	3.123909	2.00297	Reject	3.3385609	2.8600612
15829	4/92-9/98	1.359383	2.021075	Accept	3.2292369	2.9328550
16637	2/98-9/99	-0.046193	12.70615	Accept	3.6303502	3.6061161
11390	4/92-9/99	0.508544	2.014103	Accept	3.4929481	3.4107538
11391	4/92-9/99	1.249443	2.005745	Accept	3.6177204	3.4541800
15828	4/92-5/97	0.566872	2.028091	Accept	3.5792511	3.4654924
15827	4/92-12/96	1.726941	2.024394	Accept	3.8129875	3.4602464
11387	2/92-8/99	-1.238698	1.972267	Accept	3.6219088	3.7594991
15826	4/92-9/99	1.309009	1.999624	Accept	3.6073553	3.4053911
11385	4/92-5/97	0.685761	2.036932	Accept	3.8520537	3.7041645
15825	4/92-9/99	-0.332097	2.005745	Accept	3.8658688	3.9289380
15824	4/92-11/97	-0.294833	1.980097	Accept	3.9152356	3.9770959
16647	2/98-9/98	-1.780169	2.178813	Accept	3.5256923	3.9927876
16646	2/98-9/98				3.6705600	2.8920946

^a variable 1 - wet-weather data; variable 2 - dry-weather data

^b the null hypothesis is that the two datasets are not statistically different

The test performed was the t-test assuming unequal variances

The null hypothesis is rejected if $|t_{\text{stat}}| < t_{\text{crit}}$

The null hypothesis is tested at the 95% confidence level

Winter	Summer
November	May
December	June
January	July
February	August
March	September
April	October

Table 2.13 includes the results of the comparison between winter and summer data. Data in Table 2.13 indicates that 7 out of 20 stations in Buffalo Bayou showed differences between summer and winter data with a significance level of 95%; whereas 5 out of 15 stations in Whiteoak Bayou exhibited statistically significant differences between the two datasets. Overall, 35% of the FC data showed seasonal variation. A possible explanation for this variation is that FC bacteria find the lysis of macrophytes a suitable environment and the macrophyte population has been found to be greater at higher temperatures. Further analysis of this variation will be pursued in future stages of the project.

In a further analysis, FC levels were plotted against temperature to investigate trends in the data. However, no significant correlation between FC and this parameter was found.

TABLE 2.13
STATISTICAL COMPARISON OF MEANS BETWEEN DATA SETS FOR WINTER AND SUMMER

Station	Date Range	t Stat	t crit. two-tail	Null hypothesis	Geometric mean	
Buffalo Bayou					wet	dry
11142	7/92-12/98	1.578241	1.978378	Accept	2.957314559	2.784865487
11364	4/92-9/99	-2.254039	1.999624	Reject	2.407891896	2.722206993
11363	4/94-9/99	-2.382813	2.009574	Reject	2.503962164	2.908569154
11362	2/92-9/99	-2.410936	1.984217	Reject	2.859685505	3.164371315
11361	4/94-9/99	-2.506242	2.003239	Reject	2.927843478	3.275974498
11360	4/92-9/99	-0.946336	1.97897	Accept	3.212435786	3.284777939
11359	4/92-9/99	-3.090529	1.992103	Reject	2.83532993	3.229866342
15846	4/92-9/99	-3.030494	1.989688	Reject	2.771609456	3.132765499
11358	2/94-8/96	-0.318736	2.306006	Accept	2.068063601	2.705749821
11357	4/92-9/99	-3.689897	1.990452	Reject	2.827112836	3.262283259
11356	1/95-6/99	0.588173	1.9758	Accept	3.484017135	3.395636096
15845	4/92-9/99	-0.857677	1.996564	Accept	3.010629892	3.149166444
11354	4/92-9/99	0.194218	1.998342	Accept	3.109992266	3.112200824
11353	4/92-9/99	-0.783583	1.987933	Accept	3.02403931	3.101790653
15844	5/92-12/98	-0.609863	2.004044	Accept	3.089493186	3.188306846
11351	2/92-9/99	-1.068701	1.969538	Accept	3.504764101	3.48749762
15843	4/92-9/99	-1.277454	2.021075	Accept	3.37986037	3.382783955
11347	1/95-6/99	0.4473	1.9763	Accept	3.839996822	3.779586872
15842	4/92-9/96	1.2170	2.178813	Accept	3.755794536	3.452783356
11345	2/92-9/99	-1.8302	1.979602	Accept	3.562297228	3.557983587
Whiteoak Bayou						
11398	2/92-8/96	-3.772476	2.144789	Reject	2.229362787	3.231422136
15831	4/92-9/99	-3.653375	2.019542	Reject	2.730733811	3.279218944
15830	4/94-9/99	-3.741897	2.005745	Reject	2.796158808	3.308417105
15829	4/92-9/98	-1.042317	2.048409	Accept	2.976973334	3.174770185
16637	2/98-9/99	0.046193	12.70615	Accept	3.606116142	3.630350244
11390	4/92-9/99	-0.882412	2.012894	Accept	3.395527678	3.492574978
11391	4/92-9/99	-2.271066	2.014103	Reject	3.368477377	3.630132888
15828	4/92-5/97	-1.33814	2.011739	Accept	3.438800759	3.58566843
15827	4/92-12/96	-1.369016	2.039515	Accept	3.510427807	3.75807293
11387	2/92-8/99	0.786326	1.972016	Accept	3.730720846	3.646683298
15826	4/92-9/99	-1.55001	2.016691	Accept	3.362607264	3.60568662
11385	4/92-5/97	0.798291	2.073875	Accept	3.951665885	3.767880241
15825	4/92-9/99	-0.164013	2.039515	Accept	3.877750384	3.89396839
15824	4/92-11/97	-0.294833	1.980097	Accept	3.915707038	3.95244084
16647	2/98-9/98	2.3373	2.228139	Reject	4.076010079	3.486243059
16646	2/98-9/98				2.892094603	3.670560011

^a variable 1 - wet-weather data; variable 2 - dry-weather data

^b the null hypothesis is that the two datasets are not statistically different
 The test performed was the t-test assuming unequal variances

The null hypothesis is rejected if $|t_{\text{stat}}| < t_{\text{crit}}$

The null hypothesis is tested at the 95% confidence level

CHAPTER 3

ASSESSMENT OF MAJOR SOURCES, TRANSPORT AND FATE OF BACTERIA IN BUFFALO AND WHITEOAK BAYOUS

One of the main requirements of this TMDL effort is to identify sources of indicator bacteria within the Buffalo and Whiteoak watersheds (task 1.3 in Work Plan 582-0-80121-01). This chapter summarizes the available literature on sources and fate of fecal pathogens and bacterial indicators of fecal contamination in the environment; presents a summary of source assessments for other bacteria TMDLs conducted in recent years; and analyzes the potential sources of high bacteria levels in the bayous with the data that are currently available. The analysis is intended to aid in the identification of data gaps and support the development of a TMDL sampling plan.

3.1 LITERATURE REVIEW ON SOURCES, FATE AND TRANSPORT OF BACTERIA

This section provides a summary of the literature associated with sources, transport and fate of fecal pathogens and bacterial indicators of fecal contamination in the environment. Most of the discussion is focused on water contamination by fecal pathogens with the exception of a brief discussion on fecal coliforms in sediments. The first three sections deal with three elusive, poorly quantified sources of fecal pathogens: sediments, bird droppings and regrowth in riverine environments. Section 3.1.4 summarizes the literature on die-off rates of fecal coliforms (FC) and fecal streptococci

(FS). The remaining subsections in section 3.1 describe the various methods that have been used to distinguish between the sources of FC and FS (human or animal, etc) as well as a detailed discussion on bacterial indicators and DNA studies.

3.1.1 Sediments

Stream sediments have been shown to contain fecal coliforms at concentrations higher than those observed in the overlying water column. Ashbolt *et al.* (1993), Van Donsel and Geldreich (1971) and (Buckley *et al.*, 1998), for example, suggested that sediments may contain 100 to 1,000 times the number of fecal indicator bacteria contained in the overlying water.

Crabill *et al.* (1999) analyzed FC in water and sediment samples from Oak Creek, AZ. They found sediment samples with up to 2,200 times the FC counts of the water column. Results showed that resuspension of sediments due to agitation by recreational activities and storm events during summer season negatively impacted the water quality.

Studies on the survival of bacteria indicate that sediments present an environment favorable for growth. Fecal bacteria have been shown to survive and, to a certain extent, even to grow in sediments. Hood and Ness (1982) reported on the survival of *Vibrio cholerae* and *Escherichia coli* in sediments and work by Gerba and McLeod (1976) and LaLiberte and Grimes (1982) showed evidence of survival and growth of *E. coli* in sediments.

Davies *et al.* (1995) studied the survival of fecal coliforms (FC), fecal streptococci (FS), and *Clostridium perfringens* spores in freshwater and marine sediments from sites near sewage outfalls. They observed that, in the absence of predators, fecal coliforms may grow in both freshwater and marine sediments, while under natural

conditions (presence of predators) a net die-off occurs. Authors also studied viable but nonculturable (VCN) formation of *E. coli* in aquatic sediments associated with sewage outfalls. Throughout the duration of the experiment (68 days), the same proportion of *E. Coli* organisms remained culturable, which suggests that sediment provide a favorable environment for bacterial growth. Furthermore, some studies show that sediments allow an extended survival of bacteria in comparison with water environments (Goyal and Adams, 1984; Hendricks, 1971; LaBelle *et al.*, 1980; Van Donsel and Geldreich, 1971).

Burton *et al.* (1987) tested four human-associated bacteria (*Pseudomonas aeruginosa*, *Salmonella newport*, *E. coli* and *Klebsiella pneumoniae*) for survival in five freshwater sediments. They found differences of up to 5 orders of magnitude in die-off rates among the different species. Results indicated that the levels of FC and other pathogens are higher in sediments than in the overlying water. The mechanisms contributing to high FC concentrations in sediments include adsorption, sedimentation, and extended survival. This study suggested that the sediment reservoir allowed the survival of enteric and pathogenic bacteria for several months; therefore, resuspension of bacteria may impact levels of FC in the overlying water.

Pommepuy *et al.* (1992) documented the accumulation of indicator bacteria and viruses in sediments and associated it to the sorption of the microorganisms to particles suspended in water, which sediment out. Furthermore, because light penetration is prevented by suspended matter, survival in sediments may be longer.

Marino and Gannon (1991) noted that balance between predation and growth could be reached and afterwards the bacteria levels would persist at fairly constant levels.

They concluded that storm drain sediments serve as reservoirs of high concentrations of FC and FS during warm, dry weather periods.

Analysis of sediment samples from recreational waters in UK by Obiri-Danso and Jones (2000) showed no obvious seasonal trend in FC numbers. Fecal indicators were found predominantly in surface layers and numbers decreased with depth. Results of experiments to study the *in situ* deposition of bacteria onto clean surfaces from the water column during tidal cover showed a deposition rate of 0.1% of the total population of FC. Results indicated that sediments act as a reservoir for fecal indicators.

Work by Erkenbrecher (1981) in an urban shellfishing subestuary also confirmed that sediments act as reservoirs of microorganisms in aquatic environments. Furthermore, Grimes (1975 and 1980) stated that sediments act as reservoirs of FC in aquatic environments and with turbulence they resuspend and increase water concentrations.

Baudart *et al.* (2000) compared *Salmonella* and fecal coliform loads to coastal water from a river and a wastewater treatment plant (WWTP) outfall. They found that bacterial loads from the river were higher than those from the outfall and were associated with small clay particles ($< 2\mu\text{m}$) originating from different reservoirs. The bacteria trapped in the particles-sediment accumulated in the downstream part of the river during the lowest water levels and were resuspended during storm events.

Pettibone *et al.* (1996) noted that ship traffic resuspends contaminated bottom river sediments, which may impact water quality. They observed increases in FC, heterotrophic plate count (HPC) and total suspended solids (TSS) immediately after the ship passed with the largest increases at the mid-channel sites. The authors determined that FC levels were strongly correlated with TSS in the water column suggesting re-

entrainment of particle-bound bacteria. They called attention to the fact that since flocculation affects the hydrodynamic properties of particles and their transport, the characteristics of flocculated sediment should be considered in water quality modeling.

Finally, results from laboratory experiments conducted by Howell *et al.* (1996) to measure FC and FS mortality rates at three different temperatures and in three feces-amended sediments with different particle size showed that rates declined as sediment particle size decrease and as temperature decreased. However, they found no interaction between these two factors and fecal bacteria persistence. Finally, they concluded that the FC/FS ratio was influenced by temperature, the presence of sediment, and sediment particle size.

3.1.2 Birds as Sources of FC

A number of papers in the general literature have indicated that bird droppings are a source of FC to recreational waters, presenting the possibility of disease transmission (Butterfield *et al.*, 1983; Furness and Monaghan, 1987; Gilliland and Baxter-Potter, 1987; PBS&J, 2000).

Levesque *et al.* (1993) investigated the effect of gull droppings on fecal coliforms in water by measuring fecal coliform concentrations before and after the presence of a significant number of gulls near a monitoring point in the St. Lawrence river, Quebec. They found that the concentration of FC in water increased rapidly as a consequence of an increase in the number of gulls and demonstrated that these two variables were closely related. An increase in the number of gulls presents a potential for health impacts as gull droppings have been shown to contain fecal material. For instance, gull droppings have shown the presence of *Salmonella* (Girdwood *et al.*, 1985; Kapperud and Rosef, 1983;

Kirkpatrick, 1986 Butterfield, 1983 #3); *Campylobacter fetus* (Kapperud and Rosef, 1983; Whelan *et al.*, 1988); and *Yersinia* (Kapperud and Rosef, 1983).

3.1.3 Regrowth

After inactivation or injury of bacteria by disinfection processes (chlorination, UV, ozone addition), microorganisms may eventually reactivate and regrow, generating an increase in concentrations in the receiving stream. A number of studies in the general literature have shown evidence of regrowth, most of them, however, have been conducted in drinking water distribution systems and only two studies reported here report on reactivation in a WWTP effluent.

Hancock and Davis (1999) investigated photoreactivation and regrowth of FC in effluents of WWTP using UV as disinfectant. Authors reported that "shielding of bacteria ingested in *Daphnia sp* in the plant outfalls was shown to be a major contributor to increased fecal coliform, *E. coli*, fecal streptococci and enterococci after fragmentation of the *Daphnia* due to normal dieoff."

Sanchez-Ruiz *et al.* (1995) investigated the potential regrowth of bacteria in wastewater disinfected with peracetic acid (PAA) after discharge of the treated water to the ocean. After disinfection and mixing with seawater in laboratory experiments, total coliforms presented higher T90 values and disappearance times and showed increased concentrations in darkness.

Joret *et al.* (1991) reported a strong relationship between biodegradable dissolved organic carbon (BDOC) values and the regrowth potential of bacteria in samples inoculated with a natural biomass, fixed on sand particles.

Mechsner *et al.* (1991) pointed out that bacteria damaged by UV could undergo repair and regain activity. Their paper showed evidence of regrowth of sublethally UV-injured bacteria. This is relevant as exposure to light is warranted in surface waters.

Muyima and Ngcakani (1998) investigated the quality of drinking water in Alice, Eastern Cape. They measured regrowth of heterotrophic bacteria, total and injured coliforms in the chlorinated water. Results showed remarkable regrowth of these bacteria associated with high biodegradable dissolved organic carbon content.

Power and Nagy (1999) reported bacterial regrowth within Sydney's drinking water distribution system. The presence of high bacterial numbers correlated to turbidity and distance from the initial treatment point.

Springthorpe *et al.* (1993) compared the survival of *E. coli*, *Enterococcus durans*, MS-2 phage, poliovirus type 1, and hepatitis A virus (HM-175) in river water under identical conditions. Results showed that the survival patterns of *E. coli* in nutrient rich river water were highly variable and a 10-fold or greater increase in numbers of *E. coli* was sometimes observed. In addition, no regrowth was observed for *E. durans* and the phage survival was similar to that of the human pathogenic viruses.

3.1.4 Factors Affecting Survival/Die-Off

Several studies have focused on the factors affecting the survival of bacterial microorganisms in water and some have even provided rates of loss for such organisms. This section presents a summary of the literature reviewed to date pertaining to this topic.

Auer and Niehaus (1993) conducted field and laboratory studies to develop and verify the kinetic expressions required to simulate the loss of FC in lakes due to die-off and sedimentation. They observed no consistent relationship between the dark die-off rate

(0.73/day) and temperature. The irradiance-mediated death rate was shown to be proportional to irradiance. They also estimated a settling loss rate of 1.38 m/d.

Burkhardt *et al.* (2000) investigated the effect of various factors on the survival of FC, *E. coli*, *Clostridium perfringens*, and male-specific bacteriophage (MSB) in estuarine waters. They found that sunlight and/or temperature have the greatest impact on indicator decay rates. Exposure to sunlight accounted for a reduction of up to 99% of the FC density, being the indicator affected the most by this parameter. For FC the effect of sunlight was most pronounced in winter than during summer.

Research conducted by Dan *et al.* (1997) showed that the survival of bacteria (*E. coli* and enterococci) was highly dependent on environmental conditions. Inactivation of *E. coli* appeared to be initiated by light, even though the presence of sulfide also made the cells non-culturable.

El-Sharkawi *et al.* (1989) investigated the effects of certain environmental factors on the die-off of *Salmonella typhi*, *Salmonella wein*, *Shigella flexneri*, and *E. coli* in different types of water. Results showed no great difference in the survival times of the organisms tested at temperatures between 25-35°C, but the rate of die-off was higher at 40°C. *Salmonella* bacteria were not affected by salinity, however *Sh. flexneri* and *E. coli* appeared to survive longer in freshwater than in seawater. Sunlight was shown to have a negative impact on the survival of all the tested organisms, but artificial light had a smaller effect.

Esham and Sizemore (1998) conducted an intensive monitoring of fecal coliforms in Futch Creek, NC in an attempt to determine sources of pollution. Effects of various environmental factors were evaluated. Results showed higher FC levels in warmer

temperatures as well as an inverse relationship between FC counts and salinity. Tidal cycles also affected FC counts with substantially higher counts during low tide; tidal effect appeared to be more important than rain events.

Results from laboratory experiments conducted by Howell *et al.* (1996) to measure FC and FS mortality rates at three different temperatures and in three feces-amended sediments with different particle size showed that rates declined as sediment particle size decrease and as temperature decreased. However, they found no interaction between these two factors and fecal bacteria persistence. Finally, they concluded that the FC/FS ratio was influenced by temperature, the presence of sediment, and sediment particle size.

Nasser and Oman's (1999) work indicated that the inactivation of viral agents in water depends on the water quality, temperature and microorganism type. The effect of temperature was found to be microorganism type dependent but, in general, virus inactivation increased with increased temperature. The inactivation rate of *E. coli* was higher than that of hepatitis A virus (HAV) and poliovirus 1 at lower temperatures. The effect of temperature was significant in GW and less significant in raw wastewater (enhanced virus persistence). Male-specific bacteriophages persisted for the longest time in the various water types, whereas *E. coli* inactivation was the fastest in GW at 4°C and 37°C. F+ bacteriophages were shown to be more suitable than *E. coli* for predicting inactivation of pathogenic viruses in natural waters. The inactivation of male-specific bacteriophages was lower than that of *E. coli* under all experimental conditions, suggesting greater persistence in water and, consequently, the possibility of being a more suitable indicator.

Olson *et al.* (1999) found that oocysts could survive at -4 and 4°C in water and soil for more than 12 weeks but degradation was accelerated at 25°C, which suggests a strong relationship between die-off rates and temperature. On the other hand, Pathak and Bhattacharjee (1994) stated that microbial survival is highly dependent upon the trophic state and concentration of different pollutants.

FC, FS and salmonella were measured from water and sand samples to evaluate the extent of marine pollution due to occasional untreated wastewater discharges. Samples were taken 5 and 10 m away from an emergency outfall. It was found that the intensity of accumulation of fecal indicators was reduced 50% from the 5 to the 10 m locations. Bacteria showed inactivation due to solar radiation (Shatti and Abdullah, 1999).

Sinton *et al.* (1999) compared sunlight inactivation rates of somatic coliphages, F-specific RNA bacteriophages (F-RNA phages), and FC using sewage-seawater mixtures. They found sunlight inactivation rates higher than dark inactivation rates for all the tested organisms, being the greatest for FC. They observed that raw sewage FC were inactivated faster than pond effluent FC. In addition, inactivation rates decreased with the increase in spectral cutoff wavelength.

3.1.5 Indicators

Extensive research has been conducted over the years to find an organism that serves as quantitative indicator of the extent of fecal contamination in water. This section presents a summary, by no means comprehensive, of such studies.

Burkhardt *et al.* (2000), while investigating the effect of various factors on the survival of FC, *E. coli*, *Clostridium perfringens*, and male-specific bacteriophage (MSB)

in estuarine waters, found that FC was the indicator affected the most by sunlight and that the effect was most pronounced in winter than during summer. Overall, FC decay rates were very different to those found for MSB. Therefore, authors concluded that FC may not be a good indicator of viruses in estuarine waters.

Crane and Moore (1986) called attention to the fact that fecal streptococci provide information on relative age of contamination since streptococci die-off more rapidly in the environment than do coliform organisms.

Elmund *et al.* (1999). after conducting a study to correlate *E. coli*, TC and FC in WWTP effluent and a receiving stream, suggested that *E. coli* is a good indicator of fecal contamination in water and would provide greater health protection for contact recreation and human consumption than the traditional FC group.

Furuse (1987) concluded that male-specific RNA coliphage are better indicators of human sewage where they are commonly found than animal feces where they have shown a low and sporadic recovery rate

Hadas *et al.* (2000) conducted an interdisciplinary biological, physical and chemical approach to determine the distribution of bacteria and river alluvium at the mouth of the Jordan river, Israel. Results from the distribution of FC analysis showed that the maximal longitudinal gradient was at the bar, so FC can be used as indicator of fecal contamination coming from the river and entering the lake. FC varied accordingly to attenuation of flow velocity. At the entrance to the bar, sedimentation was found to dominate, while dilution was the process dominating beyond the bar.

Huysman *et al.* (1993) pointed out that *C. perfringens* is a very specific indicator of pollution of manure origin. Kay *et al.* (1994) conducted research at beaches in the

United Kingdom and found enterococcus a better indicator than coliform for predicting the likelihood of gastroenteritis. They demonstrated a mathematical relationship between gastroenteritis and fecal streptococcus.

Miyabara *et al.* (1994) pointed out that urobilin indicates fecal contamination over long period of time, while NH₄-N and total coliforms indicate more recent contamination. This study attempted to classify urban rivers on the basis of these parameters to estimate the origin of water pollution.

Nasser and Oman (1999) research's results showed that F+ bacteriophages are more suitable than *E. coli* to predict inactivation of pathogenic viruses in natural waters. In their experiments, the inactivation of male-specific bacteriophages was lower than that of *E. coli* under all experimental conditions, suggesting greater persistence in water and, consequently, the possibility of being a more suitable indicator.

Nuzzi and Burhans (1997) conducted a water quality study of bathing beaches in the Suffolk County, NY. This study was conducted to compare the total- and fecal coliform standards to a proposed enterococcus standard. Results showed that enterococcus values correlated well with coliform values but enterococcus standard would result in increased beach closures.

Puig *et al.* (1997) found that strains HSP40 and RYC4023 of *Bacteroides fragilis* selectively detect bacteriophages excreted by humans. The authors performed tests on the specificity of detection using slaughterhouse wastes and found that the procedures may be useful for fingerprinting human fecal pollution.

Sinton *et al.* (1999) compared sunlight inactivation rates of somatic coliphages, F-specific RNA bacteriophages (F-RNA phages), and FC using sewage-seawater mixtures.

They found that inactivation rates decreased with the increase in spectral cutoff wavelength and indicated that FC and F-RNA phages are more susceptible than somatic coliphages to longer solar wavelengths, which suggested that the later could be a better indicator of fecal contamination in seawater.

Sobsey *et al.* (1998) conducted a study on alternative indicators where a wide range of indicators of fecal contamination were evaluated. The studied indicators include Coliphages, Bacteri-phages, Male-specific (F+) coliphages, *Bacteroides fragilis* phages, Salmonella phages, Fecal coliforms, Enterococci, and *Clostridium perfringens* spores. The authors reported that conventional indicators (FC, EN) did not adequately represent the degree of fecal contamination of water and did not predict the presence of viruses in oysters. Results showed that F+ coliphages and *C. perfringens* are good predictors of the degree of wastewater input and of enteric viruses. *B. fragilis* and *Salmonella* phages were reported to be relatively unsuitable.

Springthorpe *et al.* (1993), as discussed in section 2.4, compared the survival of *E. coli*, *Enterococcus durans*, MS-2 phage, poliovirus type 1, and hepatitis A virus (HM-175) in river water under identical conditions. The observations concerning *E. coli* (variable survival and potential for regrowth) questioned the suitability of *E. coli* as water quality indicator; MS-2 appeared to be a good indicator.

3.1.6 Source Identification

It is well known that contamination by FC in recreational waters is caused by a number of sources that may or may not be of human origin. For example, Conboy and Goss (1999) sampled over 300 rural drinking water wells throughout Southern Ontario and 148 wells in rural Zimbabwe for bacteriological water quality. The bacteriological

quality was assessed measuring TC, FC, and FS and determining the presence or absence of *Clostridium perfringens*. They found that a significant percentage of the bacteria of fecal origin in rural wells came from animal manure and human waste disposal systems (septic tanks or latrines). Therefore, the use of only one or two bacterial indicators is not always effective to locate the source of contamination due to the multiple pollution sources.

Several methods have been suggested to attempt distinguishing the sources of contamination as will be summarized in the following paragraphs.

Atypical colonies

Brion and Mao (2000) conducted research on the relationships between atypical colonies (AC) from total coliforms (TC) tests and other bacterial indicators in a watershed impacted by agricultural and urban animals. TC, FC and coliphage (CP) were monitored at eight locations including sites impacted by raw sewage, agricultural runoff, urban runoff, and a mixture of urban and agricultural runoff. Results showed a clear relationship among AC concentrations, fecal pollution sources, and pollution levels. AC concentrations correlated well with FC but did not do so with total CP. The ratio of AC to CP correlated well with the degree of fecal pollution. The authors concluded that the AC, when used in conjunction with other indicators, may provide an additional tool for monitoring fecal contamination. Specifically, data from their study suggested that the ratio AC (coliforms, possible coliforms, and noncoliform opportunistic pathogens) to TC might help in identifying urban runoff from agricultural sites. Furthermore, this ratio may provide insight into the age of fecal pollution although more research is needed to confirm this conclusion.

Bile acids

Elhmmali *et al.* (1997) studied the use of bile acids as an indicator of sewage contamination. They found the major bile acids to be more resistant to decay during wastewater treatment than coprostanol. He was able to differentiate between the bile acids of humans and pigs, which makes this method potentially adequate for indicating human sewage. It was pointed out that further research would be needed prior to implementing this method, though.

Elhmmali *et al.* (2000) combined the use of bile acids, stanols and sterols to assess the sources of fecal matter into the Avon River, Bristol, UK. The concentrations of fecal bile acids increased along the course of the river in agreement with the results obtained for coprostanol, the traditional indicator of fecal pollution and other related stanols and sterols. On the contrary, non-fecal sterols and stanols decreased in concentration as compared to coprostanol and other fecal indicators in the lower reaches of the river. Results of bile acid analyses supported their use as sewage contamination markers. Authors concluded that a combined multimolecular approach provided an improved tool to assessing fecal matter inputs into aquatic environments.

DNA Analysis - Polymerase Chain Reaction (PCR)

Polymerase Chain Reaction (PCR) is an enzymatic reaction that is used to amplify DNA for very sensitive detection of DNA sequences. After amplification, a variety of methods and probes can be used to visualize the presence or absence of the targeted sequence. Amplification of the *uidA* gene, which codes for a specific enzyme in *Eschericia coli*, and subsequent Southern blotting has been used to successfully identify *E. coli* in polluted river water (Iqbal *et al.*, 1997). Oberst *et al.* (1998) used Multiplex

PCR to target multiple genes simultaneously. They noted that once the DNA has been amplified, the amplified product must be detected in order to confirm its presence. This can be done through gel electrophoresis, Southern blots or dot blot hybridizations with probes, and more recently 5' nuclease assays. Oberst *et al.* (1998) investigated the applicability of 5' nuclease assays to detecting PCR products, specifically *E. coli* 0157:H7. A fluorogenic TaqMan probe was designed and used in the automated amplification/detection process. The assay Oberst *et al.* proposed was successful in detecting *E. coli* 0157:H7 in a specific, rapid manner.

Nested PCR has also been used to amplify the *uidA* gene. Nested PCR increases sensitivity by using the product of the first PCR cycle as a template for the second cycle of PCR. The amplified DNA is visualized on an agarose gel stained with ethidium bromide. This method provides rapid results with detection of 1-10 cells/50 mL, as contrasted by the two to three days required for Southern blotting and biochemical detection methods (Juck *et al.*, 1996).

Arias *et al.* (1998) combined cultural-based methods and PCR, as well as comparing primers and PCR versus nested PCR to differentiate *Vibrio vulnificus* (an important pathogen that causes primary septicemia and necrotizing wound infection in addition to gastroenteritis). The PCR based methods of detection proved to have fewer positives than the cultural based methods, presumably providing more accurate results since they overcome the viable but non-cultural problems posed by this organism.

Fricker and Fricker (1994) conducted a study to determine the potential use of two sets of primers (*uidA* gene and *lacZ* gene) for the simultaneous detection of *E. coli* and coliforms. They concluded that the polymerase chain reaction (PCR) can be used for

the rapid identification of *E. coli* using these primers, with a substantial reduction in time when compared conventional analytical methods.

Work by Gilgen *et al.* (1995) looked at using reverse transcription PCR (RT-PCR) to detect enteroviruses in water samples from rivers and lakes. Gilgen *et al.* (1995) noted that traditional methods of detection are often time consuming and labor intensive. The detection system Gilgen *et al.* developed did detect enteroviruses, but also found significant amounts of non-specific amplification products. The authors compared PCR detection of *Escherichia coli*, *Salmonella* spp. with the RT-PCR for enterovirus. All samples that tested positive for *E. coli* also tested positive for enterovirus.

McDaniels *et al.* (1996) tested various bacteria for *gadA/B*, the gene that the glutamate decarboxylase which is specific to *E. coli*, and compared phenotypic and genotypic detection methods. Bacterial DNA was amplified using polymerase chain reaction (PCR) and visualized using slot blot hybridization. Genotypic assays using PCR and gene probes provide a higher degree of accuracy for *E. coli* detection than simple enzymatic assays. Both the *gadA/B* and *uid* gene are highly specific to *E. coli* and either will provide accurate detection.

E. faecium has several different strains which are different to resolve with cultural and PCR techniques. Quednau *et al.* (1999) proposed restriction endonuclease analysis as a method to separate the strains. Although there is some question as to whether *Enterococcus* strains and/or antibiotic resistance can differentiate between human and non-human sources, the findings of Quednau *et al.* (1999) suggested that they may be good indicators.

Tani *et al.* (1998) have shown that direct in situ PCR can be performed to detect *E. coli* with highly reliable results using the HNPP (2-hydroxy-3-naphthonic acid-2'-phenylanilide phosphate)-Fast Red TR system. The authors used fluorescence to visualize the PCR amplified sequences that are specific for various bacterial strains, including *Escherichia coli*. In-situ PCR (inside the cell as opposed to lysing the cell to release the DNA) was performed with EUB and ECOL primers. The technique used by Tani *et al.* (1998) was found to be effective at differentiating *E. coli* from other bacteria. Tani *et al.* also employed image analysis to assist in distinguishing bacterial cells from background fluorescence. The method described was found to be an effective technique for evaluation of bacterial presence in natural waters and an also determine the relative number of *E. coli* in the sample.

Ribotyping

Ribotyping is a methodology that can be used to identify and classify bacteria based upon differences in DNA, specifically the rRNA genes. Ribotyping was successfully used to discriminate *E. coli* from different sources (Parveen *et al.*, 1996; Tarkka *et al.*, 1994).

Parveen *et al.* (1999) studied 238 *E. coli* isolates from human sources (HS) and nonhuman sources (NHS) collected from the Apalachicola National Estuarine Research Reserve associated with WWTP discharges and animal wastes. The isolates were examined for differences by ribotype (RT) profile analysis. Discriminant analysis (DA) of RT showed that 97% of the NHS and 100% of the animal fecal isolates were classified correctly and the average rate of correct classification for HS and NHS isolates was 82%, which suggested that this method is appropriate for distinguishing between human and

animal fecal contamination. DA of antibiotic resistance patterns of fecal streptococci is useful in differentiating human vs. animal sources of fecal pollution in water. However, this method has some disadvantages including the fact that the antibiotic resistance patterns of bacteria are influenced by selective pressure and, consequently, may vary according to geographical location and over time.

Fecal Coliform to Fecal Streptococci Ratio (FC/FS)

Analyses of water samples collected from the lower Buffalo River, NY for a 2-year period showed evidence of the importance of runoff as a source of bacteria into the river. Average FC concentrations significantly increased with the increase in urbanization. Ratios of FC/FS were successfully used to identify human sewage sources (Irvine and Pettibone, 1996). Pourcher *et al.* (1991) successfully used the ratio between FC and FS as a method for source determination.

However, Toranzos and McFeters (1997) showed that the ratio of FC to fecal streptococci depended upon animal type and time in the environment. Thus, this ratio is an inadequate indicator of fecal contamination in watersheds where the polluting source is far away from the area of use. Brion and Lingireddy (1999) also reported that the analysis of FC/FS ratios in seven different sites representing different degrees of fecal contamination was not able to differentiate between urban and agricultural sources

Sediment bags

Nix *et al.* (1993) used sediment bags (porous bags filled with sand) suspended in the water to identify sources of fecal contamination. Authors pointed out that these bags integrate water quality data with respect to FC concentrations and retain coliform bacteria

after their initial sorption to the sand substrate. Therefore, they can identify contaminant sources even if sampling is carried out after the pollution event.

Nix *et al.* (1994) used sediment bags suspended from buoys and organized in a grid pattern around the beach to assess sources of fecal contamination. The bags eliminated the difficulty in documenting the occurrence of episodic contaminant sources and, consequently, were appropriate in tracing the pattern of the pollution plume and revealing the source. The authors found that fecal contamination of a local beach in North Vancouver, BC, Canada mainly came from storm sewers.

Antibiotic resistance

Multiple antibiotic resistance (MAR) was shown to be appropriate in differentiating point and nonpoint sources of *E. coli* in an estuarine environment (Parveen *et al.*, 1997).

Wiggins (1996) demonstrated that discriminant analysis (DA) of antibiotic resistance patterns of FS is a useful tool for differentiating human and animal sources of fecal pollution in water. He correctly classified 92% of human source (HS) isolates with an average rate of correct classification (ARCC) of 84%.

Wiggins *et al.* (1999) conducted an antibiotic resistance analysis for identifying the sources of fecal pollution in surface and ground water. Individual classification of isolates yielded an average rate of correct classification (ARCC) into four possible types (human, cattle, poultry, and wild) ranging between 64 and 78%. Higher ARCC (96-100%) were obtained when the resistance patterns of all isolates from each sample were averaged and the resulting sample-level resistance patterns were classified. Results

demonstrated that antibiotic resistance analysis can be used to classify and identify these sources.

Neural network

A neural network model was successfully implemented to distinguish between urban and agricultural fecal contamination in inputs to a drinking water reservoir. The model used bacterial (FC, FS, TC, and coliphage) and weather data to differentiate between three site classifications: urban, agricultural, and a mixture of these. Analysis of coprostannol and serotyping of male-specific coliphage demonstrated the absence of human sewage (Brion and Lingireddy, 1999).

3.1.7 Summary of Literature Review Findings

The literature review to date resulted in several findings which are relevant to this TMDL project:

1. Previous research indicates that stream sediments have higher FC levels than the overlying water column and that sediments provide a favorable environment for regrowth. Additionally, and subject to perturbations, resuspension of FC from sediments may occur and negatively impact water quality.
2. Birds have been confirmed as potential sources of FC into streams.
3. A limited number of studies (2) reported regrowth of bacteria from WWTP effluent in laboratory conditions. Other regrowth studies indicated a dependency on BOD levels to promote regrowth.
4. Bacterial die-off rates appeared to be influenced by sunlight, temperature, sulfide levels and salinity.

5. Numerous tests have been evaluated as indicators of bacterial contamination including fecal streptococci, *E. coli*, *Clostridium. perfringens*, urobilin, F+ bacteriophages, *Bacteroides fragilis*, Coliphages, *Salmonella*, and *Enterococcus durans*.
6. Several methods have been suggested for source identification including atypical colonies, bile acids, Polymerase Chain Reaction (PCR), Fecal Coliform to Fecal Streptococci Ratio (FC/FS), sediment bags, antibiotic resistance analysis, ribotyping, and neural networks.
7. Source identification (specially DNA studies) are useful to locate the main sources contributing to FC contamination at a given watershed.

3.2 LITERATURE REVIEW ON SOURCE ASSESSMENT IN OTHER TMDL PROJECTS

TMDLs on pathogens have been completed throughout the United States. Within these projects, numerous sources of bacterial contamination have been identified. Some of these projects have been summarized below to give an overview of the findings.

Choctawhatchee River, Florida (3 segments)

The US EPA Region 4 office prepared a proposed TMDL for three segments in the Choctawhatchee River for the designated uses of primary contact recreation and fishing (US EPA Region 4, 2000b). The watershed for the Choctawhatchee river covers a total of 5,362 square miles and the primary land uses are forest (44%), agricultural (22%), pasture (15%) and wetlands (16%). The only point sources that were considered in the TMDL development were wastewater treatment plants (WWTPs) with flow greater

than 1 MGD. This resulted in a total of 9 WWTPs being included, and their total combined flow was 24.715 MGD. Non-point sources (NPS) identified were pasture runoff from grazing livestock, cropland runoff, failing septic systems, wildlife contributions, cattle in streams, and urban and residential storm water runoff. BASINS and NPSM were used to link the water quality target and the source loadings. Load allocations were obtained from either literature values or calculations based upon land use, density, and fecal coliform production rates. The total load allocation for NPS was 9.8035×10^{16} cfu/30 days.

Choctawhatchee River, Florida (4 segments)

Four additional segments in the Choctawhatchee River, FL were also identified for TMDL development (US EPA Region 4, 2000a). These segments have impairments that impact their designated uses of PCR and fishing. Within these watersheds, the primary land use is agriculture, forested land and cropland comprising the main agricultural uses. Only 3 WWTPs are found within this watershed, and there have been documented permit exceedances for all of them. NPS sources include pasture runoff from grazing livestock, cropland runoff, failing septic systems, wildlife contributions, cattle in streams, urban and residential storm water runoff. Poultry and land-application of sludge are also potential sources of FC bacteria.

BASINS and NPSM were used to determine the loading reductions for each segment. Cattle in the streams and failing septic systems were modeled as direct sources to the river. Based upon model calculations, the following reductions were recommended: Alligator creek: 2.79%, Camp Branch: .78%, and Fish Branch: 20.66%. No loading reductions were recommended for Bruce Creek.

Ravine Lake, SD

Ravine Lake in South Dakota had water quality impairments due to non-point source inputs from livestock grazing runoff, livestock feeding operations, and storm sewer discharge to the lake (SDDENR Department of Environment & Natural Resources, 1999). No point sources were identified in the study. Ravine Lake is designated for warm water semi-permanent fish life, immersion recreation, and limited primary contact recreation. Modeling was performed using AGNPS and the end point for the TMDL was determined to be when every grab sample taken meets the 400 cfu / 100 mL water quality standard. Best Management Practices (BMPs) were implemented to meet the TMDL, including fencing of the lake shore to prevent direct livestock access. Follow-up monitoring showed that the fecal coliform levels had been reduced to below the water quality standard.

Aucilla River, Georgia

Aucilla River in Georgia has a designated use for fishing. In the 87 square mile watershed, 17% of the land use is forested, 29% is crop land, and 15% is woody wetland. No point sources were identified, but non-point sources were determined to be agricultural runoff from grazing, leaking septic systems, wildlife, and urban development (US EPA Region 4, 2000c). This TMDL includes detailed information regarding the NPSM/HSPF model assumptions. High fecal coliform values are not simulated in the model because the rainfall at the meteorological station did not always reflect the rainfall that was occurring in the watershed. A 58% reduction of FC concentrations is required to meet the load allocation of 3.24×10^{12} cfu/30 days.

Duck Creek, Alaska

The 1080 acre watershed in Duck Creek in Mendenhall Valley, Alaska has a primary land use of residential (50%) followed by commercial (26%) and recreation/wetland (16%) (US EPA Region 10, 2000). No point sources were identified in the watershed, but NPS of fecal coliform were urban runoff and domestic animals. Also, there was an impounded portion of the creek that was impounded that could also be a source of elevated FC since it attracts wildlife such as ducks. No flow data were available for the impoundment, and consequently no downstream impacts could be calculated. Overall, very little data was available for the TMDL modeling. A load allocation of 2.23×10^{11} FC per year, which translates into a reduction of 38%, was recommended through modeling with SWMM. Control mechanisms such as storm drain stenciling and public education on proper handling of pet waste were recommended to help meet the recommended reduction in FC.

Bayou Teche, Louisiana

Three segments in Bayou Teche, Louisiana were targeted for FC TMDL development (US EPA Region 6, 2000b). The stream segments were listed for impairment of primary contact recreation. The primary land use in the watershed is agriculture, followed by urban land use as well as some wetland and forested areas. Point sources were identified to be 30 WWTPs that have a combined flow of 3.9 MGD. Nonpoint sources include agriculture and urban runoff and possibly leaking septic tanks. A loading curve was used to calculate the loading capacity of the watershed. The total waste load allocation for point sources was 2.99×10^{10} cfu/day while the total load allocation for NPS was 1.84×10^{12} cfu/day. These allocations result in a 738% reduction of FC in the bayou. In order to achieve these reductions, the LADEQ (Louisiana

Department of Environmental Quality) proposed to stringently enforce WWTP permits and work with stakeholders to implement BMPs.

Bayou Plaquemine Brule, LA

Bayou Plaquemine Brule in Louisiana (segment 050201) was targeted for FC TMDL development (US EPA Region 6, 2000a). The stream segment was listed for impairment of primary contact recreation. The watershed of Bayou Teche receives 57 inches of rainfall per year. Agriculture is the primary land use within the watershed comprising 89% of the total area. Seventeen WWTPs discharge into Bayou Plaquemine Brule for a total combined flow of 5.3 MGD. Suspected NPS are agriculture and urban runoff, as well as possibly leaking septic tanks. Loading curves were used to calculate the loading capacity of the waterbody. In May through October, the loading capacity was found to be 1.4×10^{13} cfu/day and in November through April it was 7.98×10^{13} cfu/day. To meet water quality standards would require a 481% reduction in FC concentrations in May through October and 272% reduction in November through April.

Ochlockonee River, Florida

A TMDL for FC has been developed for two segments on the Ochlockonee River in Florida (US EPA Region 4, 2000d). The designated use for the segments is fishing. The land use in the watershed includes row crops, pasture and forest. One point source was identified as a water pollution control plant with a permitted flow of 4 MGD. In addition, leaking sewer lines, animals in the stream and leaking septic systems were considered point sources for modeling purposes. Agricultural and urban runoff were the NPS of fecal contamination. After modeling with NPSM/HSPF, a 66% reduction in fecal coliform concentration was recommended.

Vermilion River, Louisiana

In Louisiana, a TMDL for primary contact recreation was developed on Vermilion River, segments 060801 and 060802 (US EPA Region 6, 2000c). This area receives approximately 60 inches of rainfall per year and the primary land uses in the watershed are cropland and pasture (78%) and urban (10%). Within the Vermilion River watershed, there are 149 wastewater treatment plants (WWTP) with a total flow of 30.8 million gallons per day (MGD). Nonpoint sources (NPS) were identified as agricultural and urban runoff in addition to leaking septic tanks, sanitary sewer leaks and wild and domesticated animals. Following modeling with loading curves based upon in-stream bacterial counts and stream flow, a reduction of 733% was recommended for May-October and 225% reduction was recommended for November – April.

Lake Chelan, Washington

Lake Chelan in Washington was targeted for TMDL development for phosphorous and fecal coliform to protect it as a special resource (US EPA, 1994). The 924 square mile watershed surrounding Lake Chelan is largely forested and undisturbed. The lake is 50 miles long, with an average width of 1 mile and a maximum depth of at least 1,486 feet. The population in the surrounding areas of the lake fluctuates based upon seasonality but was approximately 6,600 in 1987. Control mechanisms recommended to decrease fecal coliform concentrations included encouraging individuals to change to public sewerage, boat sewage pump-outs and agricultural and storm water management.

Okatoma Creek, Mississippi

The Okatoma Creek was selected for TMDL development so that the creek would meet its designated uses of primary contact recreation. The main land use of the watershed is forest (62%), followed by pasture (31%). Several sources were identified, including two of four WWTPs that regularly exceed their permitted effluent limit, and leaking septic systems and cattle defecating directly into streams. After modeling different scenarios with BASINS and NPSM, the researchers concluded that a 75% reduction in cattle in the stream and a 50% reduction in the leaking septic system load would be adequate to reduce the nonpoint source contributions. In addition, all WWTPs are required to meet the 200 cfu / 100 mL water quality standard.

Blackwater River, Florida

A TMDL for bacteria was developed for six segments in the Blackwater River Watershed (U. S. EPA Region 4, 2000e). The 853 square mile watershed of the Blackwater River in Florida is 65% forested, 12% cropland, and 9% wetlands. Only wastewater treatment plants with flows of greater than 1 million gallons per day were considered point sources for the TMDL. In the Blackwater River watershed there is only one such plant. Nonpoint sources of fecal pathogens include pasture runoff from grazing livestock, cropland runoff, failing septic systems, wildlife contributions, cattle in streams, and urban and residential storm water runoff. The load allocation was calculated using BASINS and NPSM to be 5.08×10^{17} cfu/100 mL and the waste load allocation was calculated to be 2.63×10^{11} cfu/100 mL. Management strategies for the nonpoint sources include BMP implementation for the agricultural sources.

Republican River, Kansas

The Kansas Department of Health and Environment developed a TMDL Curve as their methodology for assessing the loading capacity of the Republican River (KDHE, 1999). This method allows the loading capacity to vary as the flow changes. To obtain the curve, first a flow duration curve is developed, where the flow is graphed versus the percent of days where the flow exceeded. From this information, a load duration curve is calculated. This is done by multiplying the concentration of the target constituent by the average daily flow. This approach allows researchers to pinpoint the sources of the contamination, whether point source or non-point source.

3.3 SOURCES OF BACTERIA IN BUFFALO AND WHITEOAK

As discussed in Chapter 2, both Buffalo and Whiteoak bayous have indicator bacteria levels that are higher than the contact recreation criteria all the way from the most upstream to downstream stations. The bacterial indicator employed to date is the Fecal Coliform (FC) test. The FC geometric means appear to increase from upstream to downstream, indicating potential inputs of FC bacteria from tributaries, point source outfalls, non-point and other possible sources along the bayou channels. While the density of monitoring stations on the bayous is very good compared to many streams in the state, the data collected on these stations are in general not sufficient to identify specific FC sources in the watershed. Thus, additional sampling specifically designed to identify sources will ultimately be needed. Therefore, this analysis of possible sources using existing watershed data, as well as the analysis of bayou data, will be the technical

basis for specifying the additional sampling described in the Bayou Monitoring Plan section of this quarterly report.

The potential sources of high indicator bacteria levels observed in the bayou include (in no particular order):

1. Treated effluent from point sources not disinfected completely,
2. Regrowth or reactivation of bacteria after point source discharge,
3. Discharge of untreated sewage due to sewer leaks or blockage,
4. Bacteria inputs from illicit dischargers,
5. Discharge of untreated sewage from failed on-site wastewater systems located in un-sewered areas,
6. Bacteria from upstream sources,
7. Bacteria from birds concentrated at bridges,
8. Bacteria from runoff, and
9. Bacteria associated with stream sediments.

This list of potential sources may not be exhaustive. If any additional sources are identified they will be added to the list.

The following sections provide a more detailed discussion of data collected and conclusions drawn for each of the potential sources listed above.

3.3.1 Incomplete Disinfection of Point Sources

In dry weather essentially all of the flow in both Buffalo and Whiteoak bayous is from point source discharges. Any search for understanding of water bacteria levels must start with this source of water. These discharges are required by their discharge permits to maintain a chlorine residual of 1 mg/L for at least 20 minutes at the design maximum

permitted flow. If the permitted capacity is 1 MGD or larger than, plants are required to dechlorinate down to a concentration of <0.01 mg/L. In practice, the chlorine contact time is much longer in dry weather and low flows. If all of these requirements were met, in theory there should be very low levels of indicator bacteria in the effluents. Since the effluents essentially are the entire bayou flows in dry weather, low bacteria levels should be the norm.

The practice appears to be very different from the theory since high FC levels have been recorded in the bayous during dry weather. Sampling done as part of a recent Greens Bayou Intensive Survey revealed that 5 of 12 samples from the smaller Wastewater Treatment Plants (WWTPs) had FC concentrations > 200 cfu/dL (colony forming units per deciliter), and that 2 of 12 samples were near 10,000 cfu/dL (City of Houston Public Works and Engineering Department, 1999). One of the problems with smaller plants may be poor control over the chlorination process. While the City of Houston treatment plants in these stream segments have a sophisticated system to regulate the dosage of disinfectant and the sodium bisulfite dechlorination agent, that is not true for many of the smaller facilities. The lack of automatic control, plus the fact that these plants are checked infrequently, may mean that high levels of indicator bacteria are not at all uncommon.

Figure 3.1 shows the locations of permitted wastewater dischargers in the two watersheds. There are 9 major WWTPs (≥ 1 MGD) in Buffalo and 5 in Whiteoak Bayous, respectively and 80 and 48 minor ones, respectively. Domestic discharges with a permitted flow of 1 MGD or more are shown with a larger symbol because they are in general required to dechlorinate their wastewater in addition to chlorination.

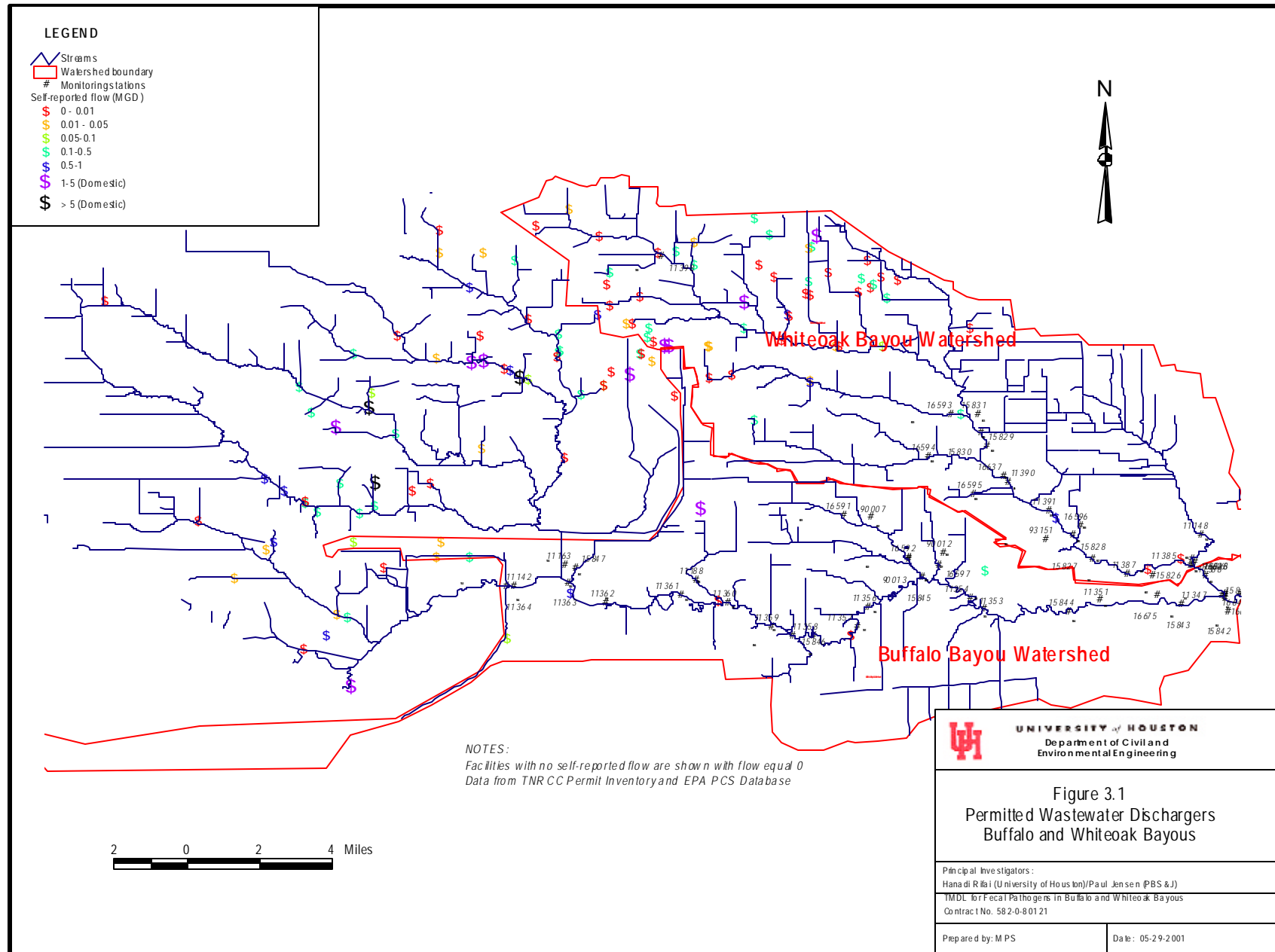


Table 3.1 lists all the dischargers to each bayou along with their permitted and self-reported ('98-'99) average flows. It can be seen that these dischargers provide a substantial flow to the bayous. For example the average flow from point sources in Whiteoak Bayou is 21.62 MGD or 33.5 cfs. This is close to the median flow determined for this stream of approximately 45 cfs.

Out of the 124 permitted dischargers located in the study area, only 18 had a fecal coliform standard and reporting requirement (see Table 3.2a for a list of such facilities). Historical self-reporting monitoring fecal coliform data from the plants listed in Table 3.2a were obtained from the EPA Permit Compliance System (PCS) and included in Appendix B. Table 3.2b includes a summary of the FC data for the last three years for the facilities shown in Table 3.1. It can be seen that the reported effluent FC concentrations meet the 200 cfu/dL standard in more than 95% of the cases in Whiteoak Bayou (3.5% exceedance) and in 100% of the Buffalo Bayou data. This may be explained by the fact that the reporting facilities are all major dischargers (flow > 1 MGD) that usually have good disinfection controls.

An estimate of the annual FC load to Buffalo and Whiteoak Bayous from point sources was completed using the total flow discharged to the bayous and the average concentrations reported in the self-reporting data from major dischargers. The FC load due to minor dischargers was calculated assuming that they discharge much higher levels of FC as suggested by the Greens Bayou Intensive Survey (City of Houston Public Works and Engineering Department, 1999). The average concentration for minor dischargers (< 1 MGD) was assumed to be equal to the average concentration from the Greens Bayou Study (2,114 cfu/dL). Table 3.3 includes an estimate of the FC point source load (PSL) to

TABLE 3.1
WASTEWATER DISCHARGERS IN STUDY AREA

Permit name	Permit number	Permitted flow (MGD)	'98-'99 Self-reported average flow (MGD)	Permit name	Permit number	Permitted flow (MGD)	'98-'99 Self-reported average flow (MGD)
BUFFALO BAYOU				WHITE OAK BAYOU			
TOSHIBA INTERNATIONAL	03153-002	0.05		AQUASOURCE DEVELOPMENT	13433-001	0.50	
VARCO SHAFFER	03994-001	0.05		HARRIS CO METRO UD	13673-001	0.20	
PETERSEN, JAMES	12398-001	0.02		KONECRANES LANDEL	13912-001	0.20	
HARRIS CO MUD 166,257,276	12474-001	0.63		TRAMMELL CROW	13996-001	0.05	
HARRIS-FORT BEND COS MUD	12498-001	0.43		WEST HARRIS CO MUD 010	14072-001	1.50	
ADAMOLI, JAMES	12811-001	0.01		NCI BUILDING SYSTEMS	12552-002	0.01	0.00
HARRIS CO MUD 276	12927-001	0.50		SMITH, WILLIAM	12573-001	0.01	0.00
HARRIS CO MUD 284	12949-001	0.10		MCDONALDS CORP.	13807-001	0.00	0.00
RLG REALTY HOLDINGS	13218-001	0.35		RIEDEL, ANTHONY	13939-001	0.00	0.00
REMINGTON MUD 001	13328-001	1.10		RESTAURANT SERVICE	13983-001	0.00	0.00
HARRIS CO-JUVENILE BOOT CAMP	13921-001	0.02		SUPERIOR DERRICK SERV	12443-001	0.00	0.00
GINTER REAL ESTATE	14011-001	0.15		PILOT INDUSTRIES	01899-001	0.03	0.01
WEATHERFORD U.S.	14070-001	0.01		TEXAS ARAI INC.	03014-001	0.04	0.01
ICO WORLDWIDE, INC.	02104-001	0.04	0.00	QUALITY PRODUCT FINISHING	03223-001	0.03	0.01
GRANT PRIDE CO	03022-001	0.01	0.00	HANOVER LAND CO.	11797-001	0.03	0.01
BAYOU CLUB OF HOUSTON	12233-001	0.01	0.00	DANIEL INDUSTRIES	12397-001	0.01	0.01
ASEP AMERICA, INC.	12355-001	0.01	0.00	TIFCO INDUSTRIES	12465-001	0.04	0.01
TRANSWESTERN KATY FREEWAY	12406-001	0.01	0.00	NCI BUILDING SYSTEMS	12552-001	0.01	0.01
COOPER CAMERON CORP	12412-001	0.01	0.00	SMITH, BOB	13509-001	0.03	0.01
ANVAZIAN, GEORGE	12427-001	0.00	0.00	COOPER CAMERON CORP.	13578-001	0.01	0.01
ROBINSON, J. WAYNE	12830-001	0.01	0.00	MOORPARK VILLAGE	13727-001	0.04	0.01
FRIEDMAN, STEPHEN	13778-001	0.01	0.00	C&P UTILITIES	12342-001	0.03	0.02
AIR LIQUIDE AMERICA	13959-001	0.00	0.00	DOMCO INC.	00785-001	0.02	0.03
OCEANEERING	12466-001	0.01	0.00	VANCOUVER MANAGEMENT	11051-001	0.03	0.03
WEST HOUSTON AIRPORT	12516-001	0.00	0.00	ABB VETCO GRAY INC	11651-001	0.03	0.03
IGLOO PRODUCTS	02229-001	0.03	0.01	FAIRBANKS PLAZA SHOPPING	12139-001	0.04	0.03
TOSHIBA INTERNATIONAL	03153-001	0.05	0.01	CBI NA-CON INC.	11389-001	0.05	0.04
VERRY, RICHARD	12310-001	0.03	0.01	WHITE OAK OWNERS ASSOC.	12132-001	0.06	0.04
HARRIS CO MUD 216	12682-001	0.40	0.01	AQUASOURCE UTILITY	12222-001	0.25	0.05
HARRIS COUNTY-CULLEN	12858-001	0.03	0.01	TOWER MANAGEMENT SERV	13764-001	0.15	0.05
HARRIS-FT BEND CO MUD	12805-001	0.25	0.02	HARRIS CO MUD 130	12574-001	0.50	0.08
GRAND LAKES MUD #4	13245-001	0.90	0.02	CREEKSIDE UTILITIES	11375-001	0.64	0.10
HARRIS COUNTY-BEAR CK	10932-001	0.04	0.03	NORTHW HARRIS CO MUD 029	12795-001	0.57	0.12
WESTON MUD	11632-001	0.10	0.03	WEST HARRIS CO MUD	13623-001	2.00	0.12
ROLLING CREEK UD	12841-001	0.90	0.03	CHAMP'S WATER CO.	11005-001	0.28	0.14
529 #35, LTD	13484-001	0.20	0.03	HARRIS CO MUD #119	12714-001	0.25	0.19
NOTTINGHAM COUNTRY MUD (WTP)	13674-001	0.05	0.03	WHITE OAK BEND MUD	11979-002	0.40	0.20
HOUSTON AREA DEVELOPMENT	13775-001	0.25	0.03	HARRIS CO MUD 247	12681-001	0.80	0.20
SASSON, ELI	11414-001	0.06	0.04	ROLLING FORK PUD	11188-001	0.49	0.26
KATY ISD	12110-001	0.10	0.04	WEST HARRIS CO MUD 011	13689-001	1.50	0.32
FT BEND CO MUD 050	13228-001	0.70	0.04	SUNBELT FWSD	11670-001	0.99	0.34
TEX-SUN PARKS	12189-001	0.09	0.05	HARRIS CO MUD 006	11273-001	0.75	0.43
HARRIS CO MUD 167	12834-001	0.60	0.05	HARRIS CO MUD 023	11485-001	0.75	0.48
FORT BEND CO MUD 034	12298-001	0.20	0.07	HOUSTON-WESTWAY UD	10495-139	1.00	0.50
HARRIS CO MUD 196	12447-001	0.50	0.07	AQUASOURCE UTILITY	11193-001	1.00	0.54
HARRIS CO MUD 250	12685-001	0.10	0.07	REID ROAD MUD 001	11563-001	1.75	0.63
NORTHWEST HARRIS CO MUD 16	11935-001	0.99	0.08	HARRIS CO MUD 170	12121-001	2.50	0.94
ADDICKS UD	11696-002	0.40	0.09	HARRIS CO FWSD 061	10876-001	1.60	0.95
WYMAN-GORDON FORGINGS	01402-002	0.45	0.11	WHITE OAK JOINT POWERS	11538-001	4.50	1.06
HARRIS CO MUD 105	11792-002	1.25	0.11	HARRIS CO FWSD 061	10876-002	3.00	1.28
NORTHW HARRIS CO MUD 012	11991-001	0.16	0.11	HARRIS CO WCID 133	11153-001	3.00	1.36
HARRIS CO. MUD #345	12356-001	0.71	0.11	HOUSTON-WHITE OAK MUD	10495-099	4.00	1.69
FORT BEND CO MUD 037	12370-001	0.18	0.11	HOUSTON-NORTHWEST	10495-076	21.00	9.27
BIG OAKS MUD	13021-001	0.20	0.11	Total flow		56.67	21.62
WEST HARRIS CO MUD 007	12140-001	0.50	0.12				
WEST HARRIS CO MUD #15	12223-001	0.35	0.14				
HARRIS CO MUD 238	12802-001	0.70	0.15				
WEST HARRIS CO MUD 017	12247-001	0.28	0.16				
CINCO MUD 001	13172-002	0.91	0.17				
WEST PARK MUD	12346-001	0.50	0.19				
HARRIS CO MUD 127	12209-001	0.33	0.20				
HARRIS CO MUD 071	11917-001	0.45	0.21				
HARRIS CO MUD 155	12726-001	2.00	0.23				
FRY ROAD MUD	11989-001	0.80	0.24				
HARRIS CO MUD 157	11906-001	1.50	0.25				
HARRIS CO MUD 185	12124-001	0.68	0.27				
SPENCER ROAD PUD	11472-001	0.98	0.33				
HARRIS CO MUD #149	11836-001	0.93	0.33				
CHIMNEY HILL MUD	12304-001	0.90	0.34				
HOUSTON-PARK TEN	10495-135	3.50	0.39				
NOTTINGHAM COUNTRY MUD	12479-001	1.30	0.40				
CASTLEWOOD MUD	11883-001	1.37	0.47				
GREEN TRAILS MUD	12289-001	0.99	0.51				
LANGHAM CREEK UD	11682-001	3.00	0.54				
HORSEPEN BAYOU MUD	12128-001	0.95	0.55				
WESTLAKE MUD 001	11284-001	1.20	0.58				
MAYDE CREEK MUD	11969-001	2.00	0.60				
CINCO MUD 001	13558-001	1.69	0.64				
WILLIAMSBURG REGIONAL	11598-001	2.00	0.74				
HARRIS CO MUD 102	11523-001	1.30	0.85				
MEMORIAL MUD	11893-001	3.00	1.19				
KATY	10706-001	3.45	1.27				
WEST MEMORIAL MUD	11152-001	6.48	1.58				
HARRIS CO MUD 208	11947-001	6.70	1.78				
JACKRABBIT ROAD PUD	11290-001	5.10	2.29				
MEMORIAL VILLAGES WA	10584-001	3.05	2.39				
HOUSTON-TURKEY CREEK	10495-109	12.00	3.89				
HARRIS CO MUD 070	11486-001	1.50	5.81				
HOUSTON-WEST DISTRICT	10495-030	26.40	11.06				
Total flow		112.25	42.39				

TABLE 3.2a
DISCHARGERS TO BUFFALO AND WHITEOAK BAYOUS REPORTING FC DATA

TNRCC PERMIT No	EPA PERMIT	PERMIT NAME	PERMITTED FLOW (MGD)	SELF- REPORTED FLOW (MGD)	RECEIVING BAYOU
WQ0011792-002	TX0070971-000	HARRIS COUNTY MUD NO.	1.25	0.11	BUFFALO
WQ0011947-001	TX0075884-000	HARRIS CO MUD NO. 208	6.7	1.78	BUFFALO
WQ0012189-001	TX0082830-000	TEX-SUN PARKS, L.C.	0.09	0.05	BUFFALO
WQ0012474-001	TX0089494	HARRIS COUNTY MUD NO. 166 257	0.63		BUFFALO
WQ0012834-001	TX0094307-000	HARRIS CO MUD NO. 167	0.6	0.05	BUFFALO
WQ0010495-139	TX0026875	HOUSTON, CITY OF	1	0.5	WHITEOAK
WQ0011188-001	TX0026697	ROLLING FORK PUD	0.49	0.26	WHITEOAK
WQ0011273-001	TX0026352	HARRIS CO MUD NO. 6	0.75	0.43	WHITEOAK
WQ0011375-001	TX0026247	CREEKSIDE UTILITIES INC.	0.64	0.1	WHITEOAK
WQ0011485-001	TX0062235-000	HARRIS CO MUD NO. 23	0.75	0.48	WHITEOAK
WQ0011563-001	TX0053325-000	REID ROAD MUD NO. 1	1.75	0.63	WHITEOAK
WQ0011979-002	TX0076651-000	WHITE OAK BEND MUD	0.4	0.2	WHITEOAK
WQ0012552-001	TX0090115	NCI BUILDING SYSTEMS L.P.	0.01	0.01	WHITEOAK
WQ0012573-001	TX0090735-000	SMITH, WILLIAM D.	0.01	0	WHITEOAK
WQ0012714-001	TX0092908	HARRIS COUNTY MUD NO.	0.25	0.19	WHITEOAK
WQ0012795-001	TX0093726-000	NW HARRIS CO MUD NO. 29	0.57	0.12	WHITEOAK
WQ0013509-001	TX0092746	SMITH BOB	0.03	0.01	WHITEOAK

TABLE 3.2b FECAL COLIFORM SELF-REPORTING DATA FOR DISCHARGERS TO BUFFALO AND WHITEOAK BAYOUS

		BUFFALO BAYOU		WHITEOAK BAYOU	
		<i>Daily average (cfu/dL)</i>	<i>Daily Maximum (cfu/dL)</i>	<i>Daily average (cfu/dL)</i>	<i>Daily Maximum (cfu/dL)</i>
1998	Maximum	10	10	437	437
	Average	7	7	17	22
1999	Maximum	28	40	96	154
	Average	12	15	17	28
2000	Maximum	2	2	40	211
	Average	2	2	17	54
Total # samples			45		260
# samples > 200 cfu/dL			0		9

Notes: See Table 3-2a for list of dischargers

Data source: EPA Permit Compliance System (PCS) accessed via Internet (www.epa.gov/enviro)

TABLE 3.3 POINT SOURCE FECAL COLIFORM LOAD CALCULATION

Bayou	(1) Total flow major dischargers (MGD)	(2) Total volume major dischargers (gal)	(3) Total flow minor dischargers (MGD)	(4) Total volume minor dischargers gal	(5) Average conc minor dischargers (cfu/100ml) ^a	(6) Average concentration major dischargers (cfu/100ml)			(7) Total Point Source load (cfu)		
						1998	1999	2000	1998	1999	2000
Buffalo	31.26	1.14E+10	11.13	4.06E+09	2,114	10	40	2	3.29E+14	3.42E+14	3.26E+14
Whiteoak	14.66	5.35E+09	6.96	2.54E+09	2,114	437	154	211	2.92E+14	2.35E+14	2.46E+14

Notes:

(1) Data from wastewater permit files (Table 3.1 reported flow <= 1 MGD)

(2) Calculated by multiplying total flow in (1) by 365 days

(3) Data from wastewater permit files (Table 3.1, reported flow < 1 MGD)

(4) Calculated by multiplying total flow in (3) by 365 days

(5) Average of concentrations reported in the Greens Bayou Intensive Survey (City of Houston PW&E, 1999)

(6) Average of maximum daily concentrations from self-reporting data for each year (Table 3.2b)

(7) Calculated by adding the product of the average concentration in major sources by the total volume in (2) plus (4) times (5)

the Buffalo and Whiteoak Bayous for the years 1998-2000. As can be seen in Table 3.3, total annual FC loads from point sources ranged between 2.35×10^{14} and 3.42×10^{14} for this period.

Additionally, FC concentrations at monitoring stations located upstream and downstream of point dischargers were compared to evaluate the impact of these sources on water quality in the bayous. This analysis is shown in Figures 3.2 and 3.3 for Buffalo and Whiteoak Bayous, respectively. As can be seen, FC levels are generally higher at the downstream locations than at the upstream locations for median flows and high flows in both bayous, with the exception of one location in Whiteoak Bayou at high flow. However, it should be noted that this type of analysis tends to be inconclusive because of the different sampling agencies and times involved.

3.3.2 Regrowth or Reactivation of Bacteria in Disinfected Wastewater

If disinfected wastewater is discharged with essentially no viable indicator bacteria but quickly takes on higher concentrations in the receiving stream, regrowth or reactivation may be occurring. Distinguishing between the two processes is difficult and may not be necessary. An example of the process is shown in Figure 3.4, taken from an older study (Jensen, 1980). Samples of primary, secondary and industrial effluents were placed in sterile containers and kept in the dark at room temperature for four days. Each day subsamples were analyzed for total and fecal coliform bacteria with the 5-tube MPN method. The plot shows the average rate of change in bacteria concentration (per hour) over the period versus the initial BOD₅ concentration. The shifts shown are adjustments in the BOD₅ values based on total organic carbon results made necessary because the

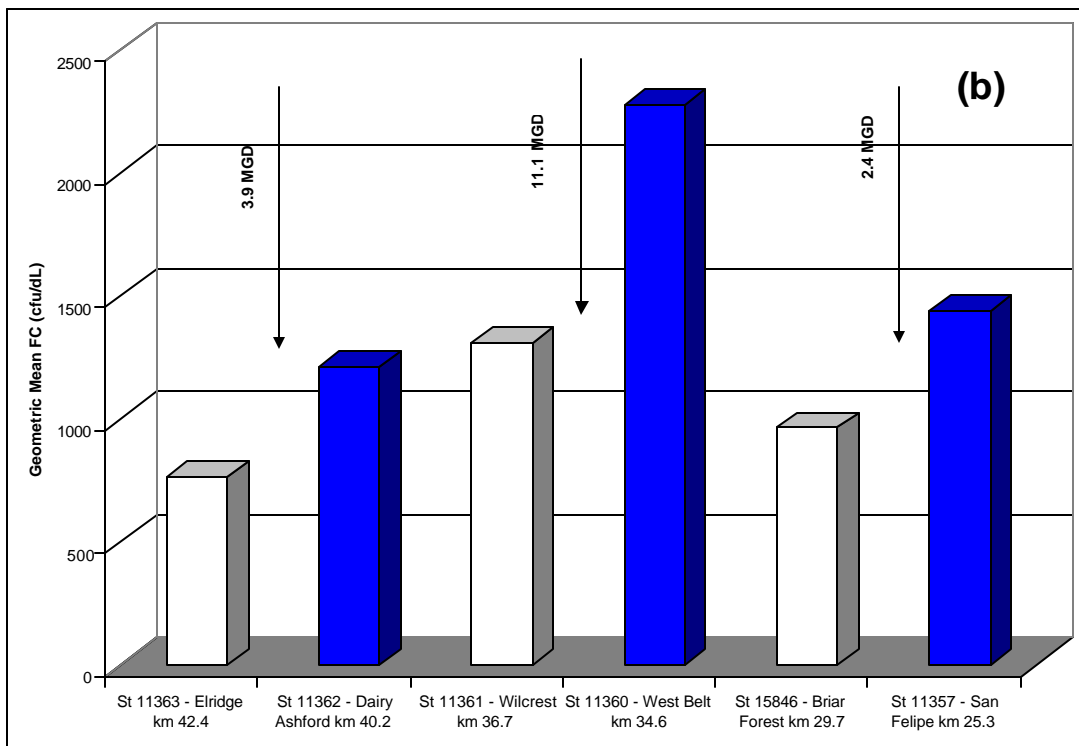
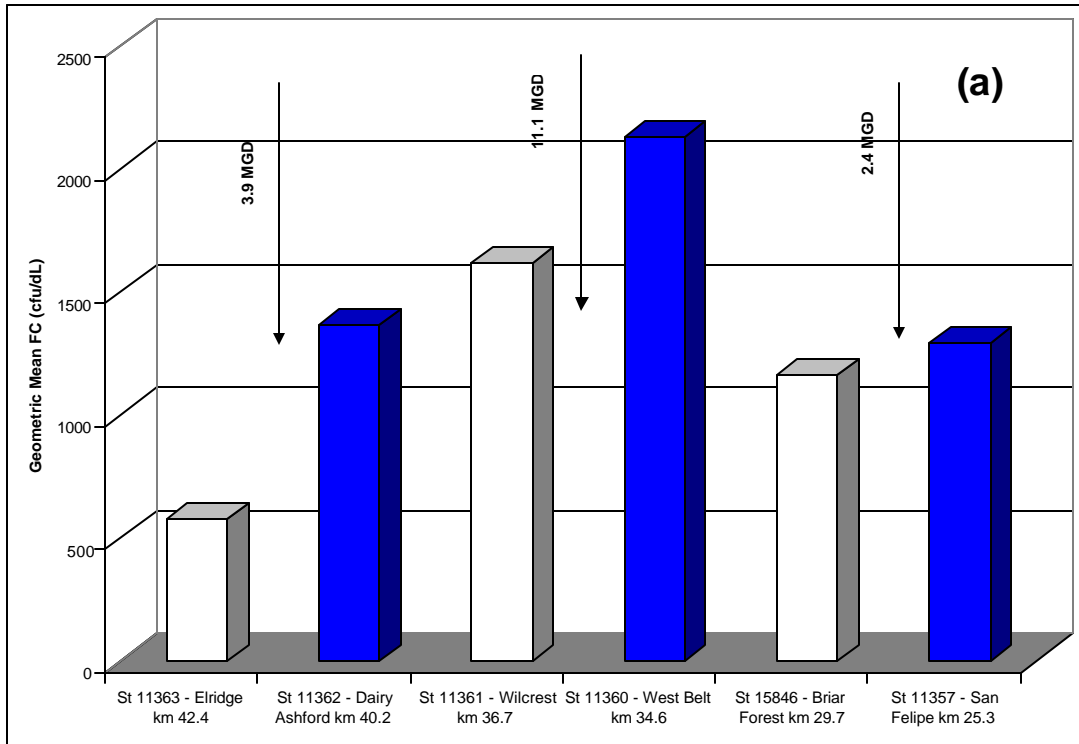


FIGURE 3-2 EFFECT OF POINT SOURCES ON FC LEVELS IN BUFFALO BAYOU AT
(a) Low Flow (b) High Flow

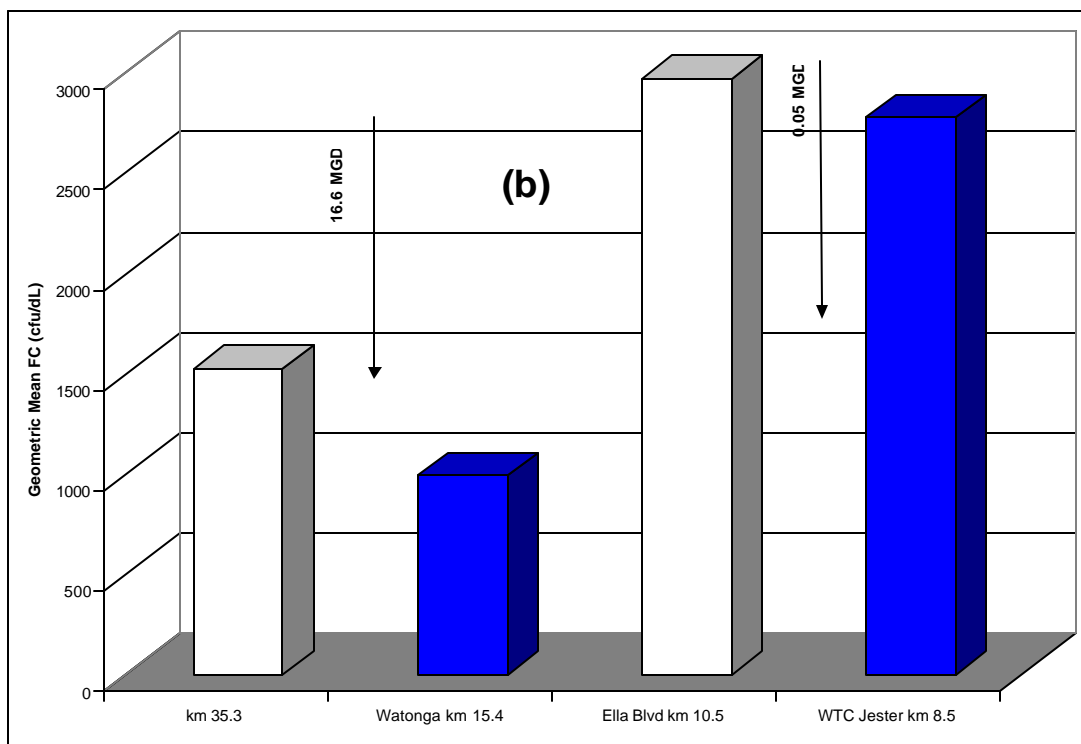
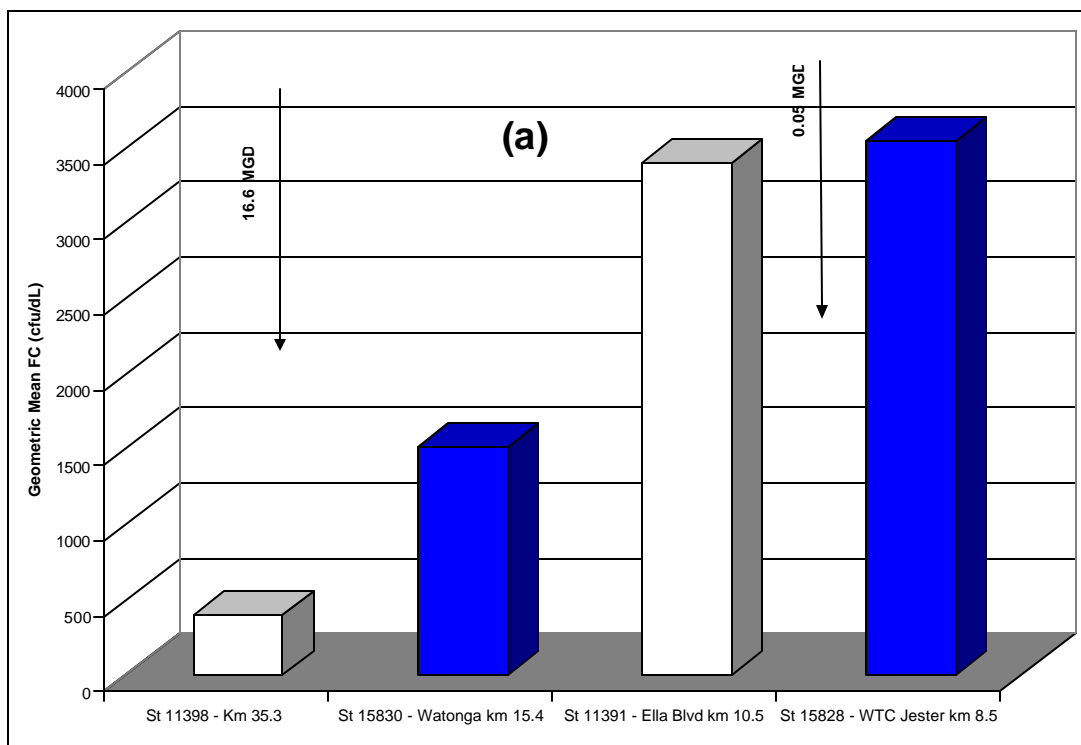


FIGURE 3-3 EFFECT OF POINT SOURCES ON FC LEVELS IN WHITEOAK BAYOU AT
(a) Low Flow (b) High Flow

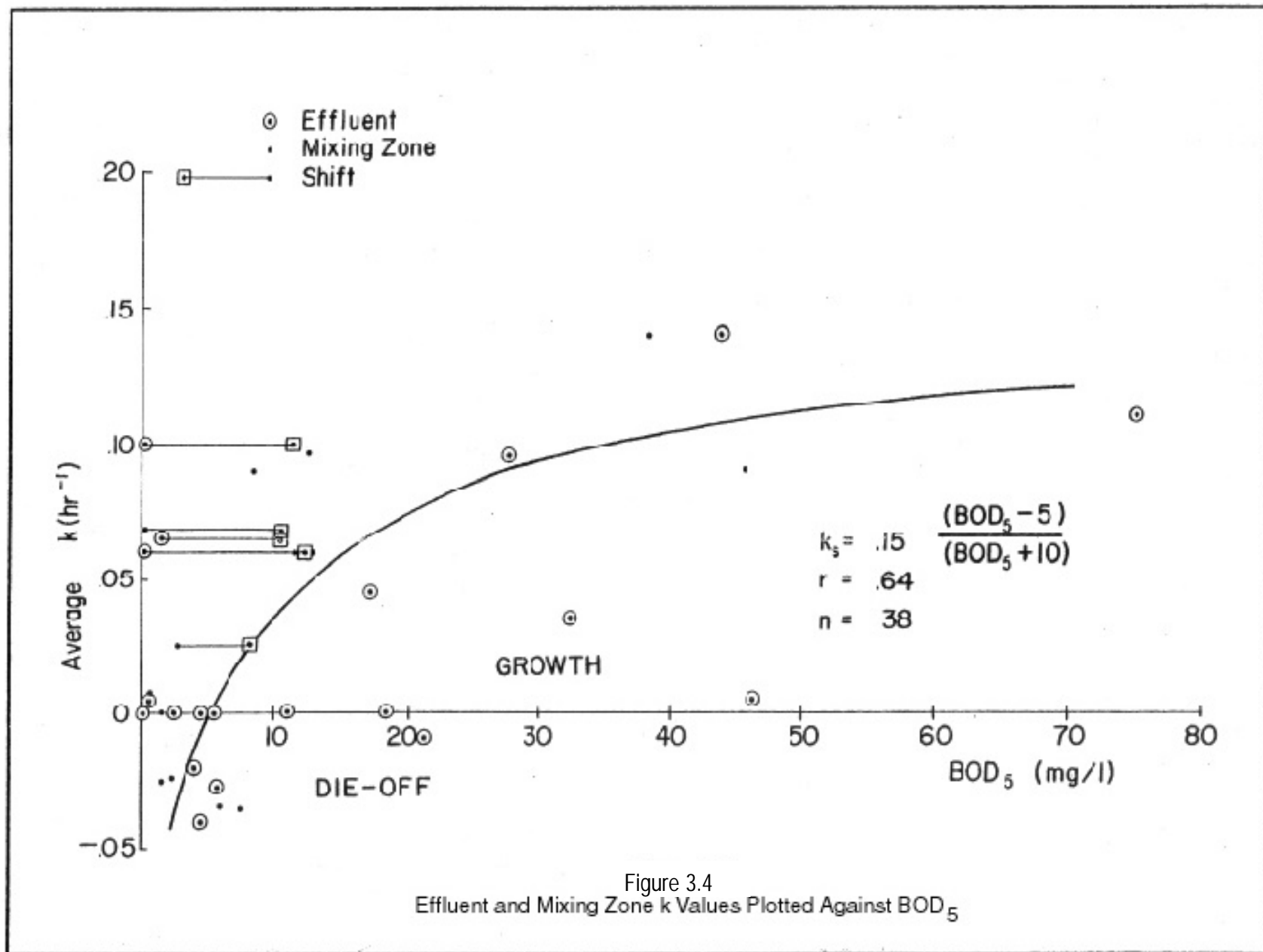


Figure 3.4
Effluent and Mixing Zone k Values Plotted Against BOD₅

Source : Jensen, P.A. 1980. Regrowth of Coliform Bacteria as influenced by Wastewater Treatment. Paper presented at Texas Section ASCE Conference, El Paso, September 25-27, 1980

BOD₅ samples had not been dechlorinated like the bacteria samples. This study found that on average, a BOD₅ concentration of 5 mg/L or less would not result in regrowth over the four-day period, but a concentration of 10 mg/L would yield an average growth rate of 0.0375/hr. This would be an increase in concentration by a factor of 2.46 in a 24-hr period.

In practice today effluents rarely reach such BOD concentrations and there is little evidence that regrowth/reactivation exists at the low levels common today.

3.3.3 Direct Sewage Discharges

A potential major source of indicator bacteria to the bayous includes sewer leaks and illicit sewage discharges. These are grouped and discussed together because they come from the same source and enter the bayou by the same method.

Sewer leaks happen for a variety of reasons including broken lines, blockages, or insufficient hydraulic capacity. Some releases only occur during wet weather conditions when infiltration and inflows cause the sewage flows to exceed the line capacity. Excess flow will find an outlet (manhole, etc.) and flow into the storm drain system to the bayou.

Of greater concern from a bayou bacteria concentration standpoint is a sewage flow during dry weather. These typically happen from a broken or blocked line. A broken line that is not visible may be very difficult to detect, particularly if the sewage flows to the bayou underground in a covered storm drain. When a sewer blockage occurs, the sewage that can no longer flow through the line backs up and finds a path that ultimately leads to the bayou. Leaks from sewer blockages are typically detected more rapidly by

those affected. While dry weather leaks tend to be small in volume, this discharge of raw sewage could contribute substantially to the high FC levels in the bayous.

To investigate the extent of sewer leakage and blockage, the TMDL team contacted the City of Houston's Health and Human Services (H&HS) and Public Works and Engineering (PW&E) departments. The H&HS provided a database containing citizens' complaints related to sanitary sewer or sewage problems. Table 3.4 lists the reports provided by H&HS that are in the study area watersheds. There were 12 incidents reported in Buffalo Bayou and 4 in Whiteoak Bayou during April 99 and June 2000. This list only covers a 15-month period and only those that elected to contact the H&HS hotline number.

The PW&E has provided a database that contains older sewer leak detection and repair information. Table 3.5 summarizes the findings during the period 1989 to 1996. The PW&E database in Table 3.5 covered a substantial period of time and found a significant number of leaks. Most appear to be caused by a blockage (Code 23) but broken lines also figure prominently.

Another set of data that was requested is the database maintained by the PW&E's Sewer Maintenance Quadrants, which actually conduct sewer repair work in the city. This database includes leaks and overflows between 1995 and 2000 as can be seen in Appendix C.

Additionally, overflows and bypasses to the Buffalo and Whiteoak Bayous reported to the TNRCC were compiled by looking at the individual wastewater discharge permit files and included in Appendix C.

TABLE 3.4
HEALTH AND HUMAN SERVICES DEPARTMENT SEWER LEAK REPORTS IN WATERSHEDS

Date	Time	Location	Nature of Complaint	Flow to Street/	NH ₃ -N	FC (cfu/100 ml.)	Watershed	Remarks
04/08/99		4726 Richmond Ave	City manhole backup				Buffalo	
04/22/99		1500 Memorial Dr	Sewer leak to storm drain	yes			Buffalo	
05/21/99	14:30	1500 Memorial Dr	Sewer leak to storm drain	yes	3		Buffalo	
06/17/99	08:40	5800 Bellaire	Sewer leak to storm drain from apartm	yes			Buffalo	
10/07/99	15:18	3754 Westheimer	Broken city sewerline	yes			Buffalo	
02/17/00		4094 Westheimer	Sewer overflow from a restaurant				Buffalo	
03/29/00	15:50	3326 Travis	Sewer overflow from a restaurant				Buffalo	
04/05/00		9310 Long Point	SSO to storm ditch	yes	3	Sampled	Buffalo	
05/30/00	12:30	9348 Long Point	Broken private sewerline	no			Buffalo	
06/07/00	09:30	14555 Grisby	Sewage in storm ditch	yes	2	Low	Buffalo	FC too low to be sewer leak
06/29/00	08:12	722 Riedel	Broken private sewerline	yes	3	21,000	Buffalo	Source from 727 Bunker Hi
07/05/00	08:15	727 Bunker Hill Place #78	Broken private sewerline	yes	3	480,000	Buffalo	FC sampled 7/7/00
11/01/99	08:38	1003 W. 34th	Illicit dumping of feces from buses	yes	> 3		White Oak	
12/07/99		2407 Airline Dr.	Illicit discharge from a restaurant	yes	0	High	White Oak	
04/28/00	11:55	1003 W. 34th	Illicit dumping of feces from buses	yes	1		White Oak	
07/05/00		6240 Antoine	Sewer blockage				White Oak	

Source: City of Houston Health and Human Services Department, Citizen Complaint Database.

TABLE 3.5
PUBLIC WORKS AND ENGINEERING DEPARTMENT SEWER LEAK REPORTS IN WATERSHEDS 1989 - 1

Date	Location	Flow (gpm)	Problem description	Watershed
03/30/89	Tiel Way Gully	50	SS discharging to gully.	Buffalo
03/30/89	Westheimer/Drexel*	30	Code 23. SS backed up to storm.	Buffalo
04/12/89	Waugh St. Outfall	50	Prvt-Milk (1930 mg/l BOD)	Buffalo
04/19/89	1111 Post Oak	10	Prvt-Laundry room to storm	Buffalo
04/19/89	Sage/Delmonte*	15	Code 23. SS plugged to storm.	Buffalo
04/19/89	Post Oak/SnFlpe-TomCtsh	0	Prvt-GT full. Grease in storm	Buffalo
04/24/89	Broad Oak Circle	30	SS to storm 24". Not shown on map.	Buffalo
04/26/89	Post Oak/San Felipe	20	SS to storm 24".	Buffalo
04/26/89	5600 San Felipe	0	Overflow inactive. NH3=16.	Buffalo
05/03/89	1410 Hyde Park	5	CO-From apt. overflowing to storm.	Buffalo
05/10/89	3128 Mt. Vernon	5	Code 23. SS plugged to storm.	Buffalo
05/12/89	Stanford/Oakley	5	SS to storm 2-12".	Buffalo
05/12/89	California/Montrose	3	SS to storm 15".	Buffalo
05/12/89	Schuler/Sandman	20	Code 23. SS plugged to storm.	Buffalo
05/12/89	Reinerman/Dickson	20	Code 23. SS plugged to storm.	Buffalo
05/23/89	Wilson/Robin	5	Code 23.MH-Andrews/Genesse holding	Buffalo
05/23/89	Valentine/Cleveland	2	Code 23.MH-Cleveland/Cushing hold	Buffalo
05/23/89	Calhoun/Baldwin	2	SS to storm.	Buffalo
05/25/89	San Jacinto/Tuam	2	Appeared to be user connect. prob.	Buffalo
05/25/89	Fannin/Tuam	2	Code 23. MH holding. SS to storm.	Buffalo
05/25/89	McGowen/Bagby	5	Dye+ into 24"&14" storm lines	Buffalo
05/25/89	Dennis/Albany	2	SS 8" to storm 60".	Buffalo
05/25/89	1900 Bailey	2	CO-Abandoned in vacant lot	Buffalo
05/25/89	Hyde Park/Hopkins	1	SS to storm. Visual verification.	Buffalo
05/25/89	McGowen/Albany*	5	Dye+ SS into storm	Buffalo
05/25/89	602 Welch	1	SS 8" to storm. CO's suspected.	Buffalo
05/25/89	Dennis/Genesse	1	SS 8" to storm. CO's suspected.	Buffalo
06/21/89	Sul Ross/Yoakum	10	Brkn line. Yoakum/Graustark	Buffalo
06/21/89	California/Lincoln	35	SS to storm MH from lines/sides	Buffalo
06/21/89	Elgin/Smith	3	Code 23. 12" SS line. MH hold 1 ft	Buffalo
06/21/89	Elgin/Brazos	2	SS to storm 18".	Buffalo
07/13/89	Louisiana/Gray	10	SS to storm MH	Buffalo
07/13/89	Smith/Hadley*	2	Code 23. SS to Storm MH	Buffalo
07/13/89	Victor/GilletteBail	5	SS to storm.	Buffalo
07/16/89	Louisiana/McGowen	3	SS to storm. S side of MH	Buffalo
07/16/89	Anita/Fannin	3	SS to storm MH	Buffalo
07/16/89	Anita/Main	2	SS to storm 18". SW side of MH	Buffalo
07/16/89	Elgin/Milam	10	Dye+ 24"&15" Cajun Rest	Buffalo
07/16/89	Westheimer/Whitney	2	SS to storm 18". S side of MH	Buffalo

Source: City of Houston Public Works & Engineering Department.

SS Sanitary Sewer
CO Cleanout
Code 23 Blockage
Dye+ Dye test performed

TABLE 3.5 (CONTINUED)
PUBLIC WORKS AND ENGINEERING DEPARTMENT SEWER LEAK REPORTS IN WATERSHEDS 1989 - 1

Date	Location	Flow (gpm)	Problem description	Watershed
07/16/89	Westheimer/Stanford	1	SS to storm Westheimer system.	Buffalo
07/16/89	Avondale/Stanford	0	Code 23. Holding about 1 ft	Buffalo
07/19/89	100ydsE WDist WWTP	15	Prvt-4" prvt main 2 bayou/pipe brk	Buffalo
07/23/89	Rusk/Bagby	3	Dye+ SS to storm from 100'away	Buffalo
07/30/89	Post Oak/Westbrier	3	Code 23. MH holding. SS to storm.	Buffalo
07/30/89	Waugh/Pierce*	4	Code 23. MH holding. SS to storm.	Buffalo
07/30/89	Alabama/SJacntoMilam	10	SS to storm.	Buffalo
08/25/89	Fondren/Richmond	0	Code 23. NH3=8 on storm.	Buffalo
09/27/89	5151 San Felipe	4	MH base leaking to storm ditch.	Buffalo
09/27/89	SanFelipe/Sage-110'W	3	SS along 2 gas lines to 72" storm	Buffalo
09/27/89	SanFelipe/Sherbrook	4	SS 10" to storm 24".	Buffalo
10/04/89	Bremond/Brazos	3	SS to storm 12".	Buffalo
10/04/89	W Loop/Hwy59-NE fdr	5	Code 23. SS MH to street to storm	Buffalo
10/11/89	Stanford/Woodrow	1	SS to storm 18".	Buffalo
10/12/89	San Jacinto/Hadley	30	SS 8" main to storm.	Buffalo
10/12/89	Fannin/Alabama	5	SS to storm. Marked.	Buffalo
10/16/89	Fannin/Alabama	4	CO-Circle K to storm.	Buffalo
10/16/89	Gillette/Robin	3	Code 23. Dallas/Gillette	Buffalo
10/17/89	California/Grant	1	D-type drain to storm. Marked.	Buffalo
10/18/89	Clarkcrest/Jeanetta	10	Dye+ 12" SS to storm	Buffalo
10/18/89	9001 Clarkcrest	2	SS line crossing to storm	Buffalo
10/24/89	2929 Fondren (Luby's)	10	Code 23. SS to storm	Buffalo
10/24/89	Westheimer/Fondren	5	SS 4" to storm. CBOD=518	Buffalo
10/26/89	Travis/Pease*	5	Prvt-18" cast iron storm frm condo	Buffalo
10/27/89	McKinney at CHA	500	Combo-PeaseTravis>Louis.Lamar	Buffalo
11/02/89	Milam/Pease	1	SS to storm 45". Marked.	Buffalo
11/06/89	Wstmreln/Burlington	2	Dye+ 8" SS to storm	Buffalo
11/13/89	Fannin/Alabama	5	Code 23. SS Circle-K/StopNGo.TV	Buffalo
11/13/89	Dallas/Gillette*	0	Code 23. SS line to storm	Buffalo
11/16/89	Stanford/Oakley	0	Code 23. SS to storm. Marked	Buffalo
11/20/89	California/Lincoln	1	Code 23. SS to storm. Marked.	Buffalo
11/20/89	6300 Westheimer	5	Code 23. SS>Briargrove.Plug end	Buffalo
12/02/89	Baldwin/Pierce	1	SS to storm. Marked.	Buffalo
12/03/89	Post Oak/San Felipe	20	SS 21" force main to storm.	Buffalo
12/07/89	California/Grant	10	Code 23. SS to storm. Marked.	Buffalo
12/07/89	2502 Westerland	30	Prvt-Private line to storm.	Buffalo
12/08/89	95 Block Tuam	1	Dye+ 0.5 gpm to storm	Buffalo
12/09/89	Smith/Gray	1	Code 23. SS to storm. Marked	Buffalo
12/12/89	Harold/Yupon	0	Overflow SS to storm. SEAL.	Buffalo

Source: City of Houston Public Works & Engineering Department.

SS Sanitary Sewer
CO Cleanout
Code 23 Blockage
Dye+ Dye test performed

TABLE 3.5 (CONTINUED)
PUBLIC WORKS AND ENGINEERING DEPARTMENT SEWER LEAK REPORTS IN WATERSHEDS 1989 - 1

Date	Location	Flow (gpm)	Problem description	Watershed
12/15/89	1400 Briar Hollow Ln	5	Dye+ SS to storm. Marked.	Buffalo
01/18/90	6300 Westheimer	5	SS 6" open backend to ditch.	Buffalo
01/22/90	Victor/Bailey	5	Dye+ SS to storm. Marked.	Buffalo
01/26/90	West Lane/Mid Lane	1	Dye+ SS to storm. Marked.	Buffalo
01/27/90	Westheimer/West Lane	10	Dye+ SS to storm. Marked.	Buffalo
01/29/90	Louisiana/McGowen	2	Dye+ SS to storm. Marked.	Buffalo
01/29/90	Cleveland/Bailey	5	Dye+ SS to storm. Marked.	Buffalo
01/30/90	1910 Indiana	5	SS overflow to storm. SEAL.	Buffalo
01/31/90	1502 Cleveland	3	Dye+ SS to storm. Marked.	Buffalo
02/01/90	Mockingbrd/Larchmnt	10	Code 23. 8" line holding.	Buffalo
02/12/90	Mockingbird/Delmont	10	Dye+ SS to storm. Marked.	Buffalo
02/14/90	Fountnview/Woodway	50	Prvt-Dye+ 2 twmhomes to storm.	Buffalo
02/23/90	Driscoll/Indiana	1	Dye+ 8" SS to storm. Marked.	Buffalo
02/23/90	2101 Hazard	4	Dye+ 6" serv main. Marked.	Buffalo
03/01/90	6300 San Felipe	30	Overflow (known) to storm ditch.	Buffalo
03/05/90	SW Frwy/Kirby	7	Code 23. MH to storm inlet.	Buffalo
03/06/90	1913 Bailey Street	5	Community line to storm inlet	Buffalo
03/13/90	Fairview/Converse	10	Community 6" to storm.	Buffalo
03/14/90	1705 Waugh Dr.	5	Dye+ SS to storm.	Buffalo
03/17/90	Vermont/Morse	2	Dye+ SS to storm. Marked.	Buffalo
03/17/90	Greely/Oakley	4	Dye+ SS to storm. Marked.	Buffalo
03/19/90	Welch/Hopkins	5	Dye+ SS to storm. Marked.	Buffalo
03/26/90	Mckngbrd/ChvyChse	3	Code 23. SS to storm. Marked.	Buffalo
04/03/90	5151 San Felipe	5	Code 23. SS trunk. Seal MH walls.	Buffalo
04/03/90	5840 Bayou Glen	0	Overflow frm 15" SS Main.MHcst/cvr	Buffalo
04/12/90	Victor/Wilson	3	Comm 6" to 42" strm Dye+on4" CO	Buffalo
04/19/90	6226 Vily Forge	5	SS 8" to storm.	Buffalo
04/27/90	6226 Vily Forge	0	Dye+ Pinpoint Seal MH wall	Buffalo
07/09/90	Drexel/Meadowlake	5	SS 6" to storm.	Buffalo
07/11/90	Milam/Tuam	1	Dye+ 8" SS to storm.	Buffalo
07/11/90	Milam/Tuam	10	Dye+ 6" comm to storm.	Buffalo
07/12/90	4401 S. Main	3	Prvt-Dye+ Church line to storm MH.	Buffalo
07/13/90	1925 Milam	3	Prvt-Dye+ Car Wash SW to storm MH.	Buffalo
07/18/90	3535 W. Dallas	10	Prvt-Dye+ Apartments to storm.	Buffalo
07/25/90	W. Dallas/Eberhard	1	SS 8" to storm. Marked.	Buffalo
08/02/90	6360 Richmond	20	Code 23. SS > storm/Tony Romas Rst	Buffalo
08/02/90	3000 blk of Fondren	20	Code 23. SS to storm/BEST Store	Buffalo
08/15/90	306 Walnut Bend	1	SS 8" to storm. Marked.	Buffalo
08/28/90	6360 Skyline Drive	15	Prvt-SS>15"prvt strm>36"Cty strm	Buffalo

Source: City of Houston Public Works & Engineering Department.

SS Sanitary Sewer
CO Cleanout
Code 23 Blockage
Dye+ Dye test performed

TABLE 3.5 (CONTINUED)
PUBLIC WORKS AND ENGINEERING DEPARTMENT SEWER LEAK REPORTS IN WATERSHEDS 1989 - 1

Date	Location	Flow (gpm)	Problem description	Watershed
08/28/90	O'Neil/Gillette	15	SS to storm. Stopped up to house.	Buffalo
09/05/90	4126 Southwest Freeway	30	Prvt-SS to storm. 12 Oaks Hospital	Buffalo
09/19/90	W. Dallas/Eberhard	30	Code 23. (1) SS overflow to storm.	Buffalo
09/24/90	4827 S. Main/Rosedale	5	SS leak to street/stm inlet NH3>3	Buffalo
09/24/90	800 Anita	10	Code 23. SS frm MH to street	Buffalo
10/16/90	3007 Crossview (3008)	7	SS leak to storm/Fajitas Flats	Buffalo
10/18/90	1916 Baldwin	5	Community 6" stopped up.	Buffalo
11/06/90	W. Dallas/Eberhard	30	Code 23. (2) SS overflow to storm.	Buffalo
11/16/90	Dennis/Genesse	20	SS 8" to storm. Marked.	Buffalo
11/26/90	W. Dallas/Eberhard	30	Code 23. (3) SS overflow to storm.	Buffalo
11/27/90	4827 S. Main/Rosedale	5	SS leak to street/stm inlet (2)	Buffalo
11/29/90	600 Elgin/Smith	5	Code 23. SS to storm.	Buffalo
12/07/90	3500 Milam/Alabama	10	MH wall leaking to storm.	Buffalo
12/07/90	700 Elgin/Louisiana	20	Code 23. SS to storm.	Buffalo
03/26/91	6300 San Felipe	75	Overflow (known) to storm ditch.	Buffalo
03/26/91	6300 Fairdale	60	Overflow (known) to storm.	Buffalo
04/18/91	10722 Meadow Lake	10	SS leak to storm.	Buffalo
05/07/91	600 Elgin/Smith	20	Code 23. SS to storm/rqst to TV.	Buffalo
05/07/91	5200 Richmond	50	Code 23. SS MH to street to storm.	Buffalo
05/08/91	4211 Southwest Freeway	15	2 yr old contract SS to storm.	Buffalo
05/21/91	2502 Westerland	40	Prvt-Private line to storm.	Buffalo
05/24/91	1925 Milam	3	Prvt-Dye+ Car Wash SW to storm MH.	Buffalo
08/01/91	600 Crestbend	200	Contractors TVing lines in area.	Buffalo
08/29/91	Gessner/Cedardale	15	SS leak to storm.	Buffalo
09/12/91	10110 Westview	15	Prvt-Westview Forest Apts.	Buffalo
10/01/91	West Belt/I-10 (Petmart)	15	SS leak to storm in parking lot.	Buffalo
10/08/91	West Belt/I-10 Sportstwn	15	SS conn to storm in parking lot.	Buffalo
03/18/92	6350 Beverly Hills	75	Overflow (known) to Bering Ditch	Buffalo
06/16/92	W. Dallas/Peveto	25	Code 23. SS to storm.	Buffalo
08/05/92	W. Dallas/Peveto	20	Code 23. SS to storm.	Buffalo
09/24/92	5300 San Felipe	100	12" SS line to storm.	Buffalo
09/29/92	Avalon/Westgate	30	Code 23. SS to storm.	Buffalo
10/19/92	Pump Station #236	100	12" force main to bayou.	Buffalo
12/02/92	Westview/Aldrich	30	SS to storm.	Buffalo
07/16/93	6150 Chevy Chase	15	SS to Bering Ditch.	Buffalo
07/23/93	Richmond at Greenridge	20	SS to Bering Ditch.	Buffalo
08/09/93	4200 W. Alabama	5	Dye+ SS to storm.	Buffalo
08/19/93	6345 Windswept	5	SS to Bering Ditch.	Buffalo
08/19/93	Woodway at Bering Ditch	5	SS to Bering Ditch.	Buffalo

Source: City of Houston Public Works & Engineering Department.

SS Sanitary Sewer
CO Cleanout
Code 23 Blockage
Dye+ Dye test performed

TABLE 3.5 (CONTINUED)
PUBLIC WORKS AND ENGINEERING DEPARTMENT SEWER LEAK REPORTS IN WATERSHEDS 1989 - 1

Date	Location	Flow (gpm)	Problem description	Watershed
09/09/93	6350 Beverly Hills	35	SS to Bering Ditch.	Buffalo
10/24/93	6146 Doliver	0.5	SS to Bering Ditch.	Buffalo
10/24/93	1403 Winrock	3	SS to Bering Ditch.	Buffalo
10/24/93	6224 Cedar Creek	2	SS to Bering Ditch.	Buffalo
11/23/93	Westheimer/Greenridge	25	SS to Bering Ditch.	Buffalo
12/06/93	10950 Briar Forest	5	Prvt-Park at Lakeside	Buffalo
01/24/94	Woodway/Buffalo Bayou	1	SS seepage from joint to bayou.	Buffalo
03/31/94	Bering Ditch/Woodway	NA	High fecal result: 510000	Buffalo
03/31/94	Fondren Outfall/Woodway	NA	Fecal result: 50000	Buffalo
04/05/94	Waco/Providence	7	SS to 30" storm.	Buffalo
04/05/94	Waco/Gunter	7	SS to 30" storm.	Buffalo
04/08/94	Pagewood	5	SS to storm.	Buffalo
04/12/94	Briarwood/Valley Forge	5	SS to storm.	Buffalo
04/26/94	Bering Ditch/Longmont	35	SS to Bering Ditch.	Buffalo
07/12/94	2710 Mason	25	Overflow active to storm.	Buffalo
07/12/94	Arthur/Robin	20	SS to storm.	Buffalo
08/29/94	100 Dairy-Ashford	20	SS to 60" storm.	Buffalo
09/23/94	14520 Memorial	?	Code 23. SS to 60" storm.	Buffalo
11/18/94	Westheimer/Mid Lane	20	SS to Briarhollow Ditch.	Buffalo
05/12/95	Sage/St. James Place	5	Code 23. SS to storm.	Buffalo
11/29/95	Not Given	?	Not Given	Buffalo
11/29/95	Not Given	?	Code 23. SS to storm.	Buffalo
12/12/95	Not Given	?	Not Given	Buffalo
01/23/96	Not Given	?	Code 23. SS to storm.	Buffalo
04/11/96	6300 Fairdale	?	Overflow (known) to storm.	Buffalo
04/11/96	6350 Beverly Hills	?	Overflow (known) to Bering Ditch	Buffalo
04/11/96	Fairdale at Voss	?	Prvt-Apartments broken sewer line.	Buffalo
05/13/96	Waco/Hare	?	SS to Storm.	Buffalo
10/02/96	Not Given	?	Not Given	Buffalo
08/24/89	Hickory/Summer	2	SS to storm 2-18". Test CO's	White Oak
08/24/89	2002 White	4	SS 4" to storm. NH3=37.1/CBOD>2490	White Oak
08/24/89	1216 Houston St.	80	SS to storm. pH=11.3/CBOD=727.	White Oak
03/21/90	WhiteOakBayou/Moody Pk	100	Brkn frce mn 24" to bayou.	White Oak
09/18/90	1600 W. T. C. Jester	20	Prvt-Timbergrove Apt. R. Alexander	White Oak
05/02/91	Reagan and Pizer	10	6" comm to storm	White Oak
06/24/91	122 E. Crosstimbers	10	Prvt-Apt to storm manhole.	White Oak
06/26/91	810 E. Whitney	25	Code 23-6" main to storm ditch.	White Oak
07/16/91	E. 14th at Norhill	30	Code 23-10" main to storm.	White Oak
07/22/91	810 E. Whitney	20	Code 23-6" main to storm ditch.	White Oak

Source: City of Houston Public Works & Engineering Department.

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CO Cleanout
Code 23 Blockage
Dye+ Dye test performed

TABLE 3.5 (CONCLUDED)
PUBLIC WORKS AND ENGINEERING DEPARTMENT SEWER LEAK REPORTS IN WATERSHEDS 1989 - 1

Date	Location	Flow (gpm)	Problem description	Watershed
07/26/91	122 E. Crosstimbers	10	Prvt-Apt to storm manhole.	White Oak
09/12/91	122 E. Crosstimbers	10	Prvt-Apt to storm manhole.	White Oak
09/25/91	500 Walton	30	Code 23-10" main to storm.	White Oak
10/24/91	810 E. Whitney	20	Code 23-6" main to storm ditch.	White Oak
10/24/91	Crosstimbers/Airline	70	SS to 36" storm to LWO Bayou.	White Oak
01/08/92	508 E. 20th Street	40	SS to street to storm to LWO Bayou	White Oak
03/03/92	Outfall #143-029	175	Overflow active in dry weather	White Oak
03/13/92	12" Plug-Union Pacific	3	12" plug leak from sewer stoppage	White Oak
03/16/92	Kiam & Reinerman	75	SS to storm.	White Oak
04/03/92	Hays and Booth	80	SS to LWO Bayou from brkn main	White Oak
07/16/92	Woodland Park	80	SS to LWO Bayou from brkn main	White Oak
09/10/92	122 E. Crosstimbers	10	Prvt-Dye ck to LWO from Apt CO	White Oak
10/28/92	Glebe & LaMonte	5	SS to storm.	White Oak
04/02/93	Woodland Park	80	SS to LWO Bayou from brkn main	White Oak
12/01/93	Crockett & Hickory	250	SS to storm.	White Oak
01/05/94	Bay Oaks & Wynnwood	50	SS to storm.	White Oak
03/17/94	LWO Bayou/Cavalcade	35	SS to LWO Bayou from overflow	White Oak
04/04/94	Hogan Bridge Outfall	75	SS to 72" storm to White Oak Bayou	White Oak
04/05/94	Turkey Creek at W 16th	NA	High fecal count: 94000	White Oak
04/07/94	2300 N Shepherd	7	Prvt-Fiesta dumpster to storm.	White Oak
04/18/94	Michaux/Winston	?	Code 23. SS to storm	White Oak
04/22/94	1505 Hemphill	?	Code 23. SS to 72" storm.	White Oak
05/26/94	Holly/Summer	?	Prvt-Contractor plug. SS to 72" storm.	White Oak
06/20/94	Holly/Shearn	20	SS to 72" storm.	White Oak
08/01/94	Vincent/Fugate	?	Code 23. SS to storm	White Oak
08/30/94	9005 Long Point	50	SS to Spring Creek.	White Oak
09/28/94	Summer/Hemphill	?	Code 23. SS to 72" storm.	White Oak
10/14/94	Summer/Taylor	20	Code 23 & Repair. SS to 72" storm.	White Oak
10/31/94	Summer/Taylor	50	Prvt-Riviana Foods spill to 72" storm.	White Oak
12/07/94	Vincent/Fugate	?	FC=2000000. SS to storm.	White Oak
08/11/95	Vincent/Fugate	?	FC=940000. Contractor plugging line.	White Oak
10/23/95	Vincent/Fugate	?	FC=2000000. SS to storm. Broken line.	White Oak
05/03/96	Vincent/Fugate	?	FC=2000000. SS to storm. Code 23.	White Oak
09/27/96	Vincent/Fugate	?	FC=1600000. SS to storm. Code 23.	White Oak
10/28/96	Vincent/Fugate	?	FC=1400000. SS to storm. Code 23.	White Oak

Source: City of Houston Public Works & Engineering Department.

SS Sanitary Sewer
CO Cleanout
Code 23 Blockage
Dye+ Dye test performed

Figure 3.5 shows the area together with reported sewer leak or blockage locations in the watersheds. As can be seen from the figure, there is a very busy and complicated sewer system in Houston area and there are many opportunities for sewer leaks to enter the bayous. However, a sewage leak must be substantial in quantity and persistence for it to impact bayou FC levels significantly. The locations of sewer leak complaints and repairs indicate that most of the leaks occurred in the older part of the city that has an aged sewer system. This situation is expected to continue and it has been and will be a long-term effort for the city to detect and repair sewer leaks as they occur.

Illicit discharges are a more complicated issue because there is no clear definition of an illicit discharge. Examples that have been discussed range from the obvious such as direct sanitary sewage connection to a storm drain, to washdown from areas around trash containers, and discharges from vehicle wash areas. Other discharges that are questionable include cooling tower blowdown and air conditioning condensate discharges. In some cases these can have significant bacteria (Glanton, 1999), but the total amount of flow that might be involved is probably fairly small.

The total volume of sewage flow discharged to the bayous (leaks, bypasses and overflows) during the last three years is summarized in Table 3.6. To estimate annual FC loads from untreated sewage, an estimate of FC concentration of 500,000 cfu/dL was used. This assumption was based on the rationale that this flow is primarily stormwater mixed with some smaller proportion of sanitary sewage; the exact proportion will vary considerably but will probably be at least five parts stormwater to one part sewage (Jensen and Su, 1992). Table 3.6 presents the estimated loads of FC from leaks and

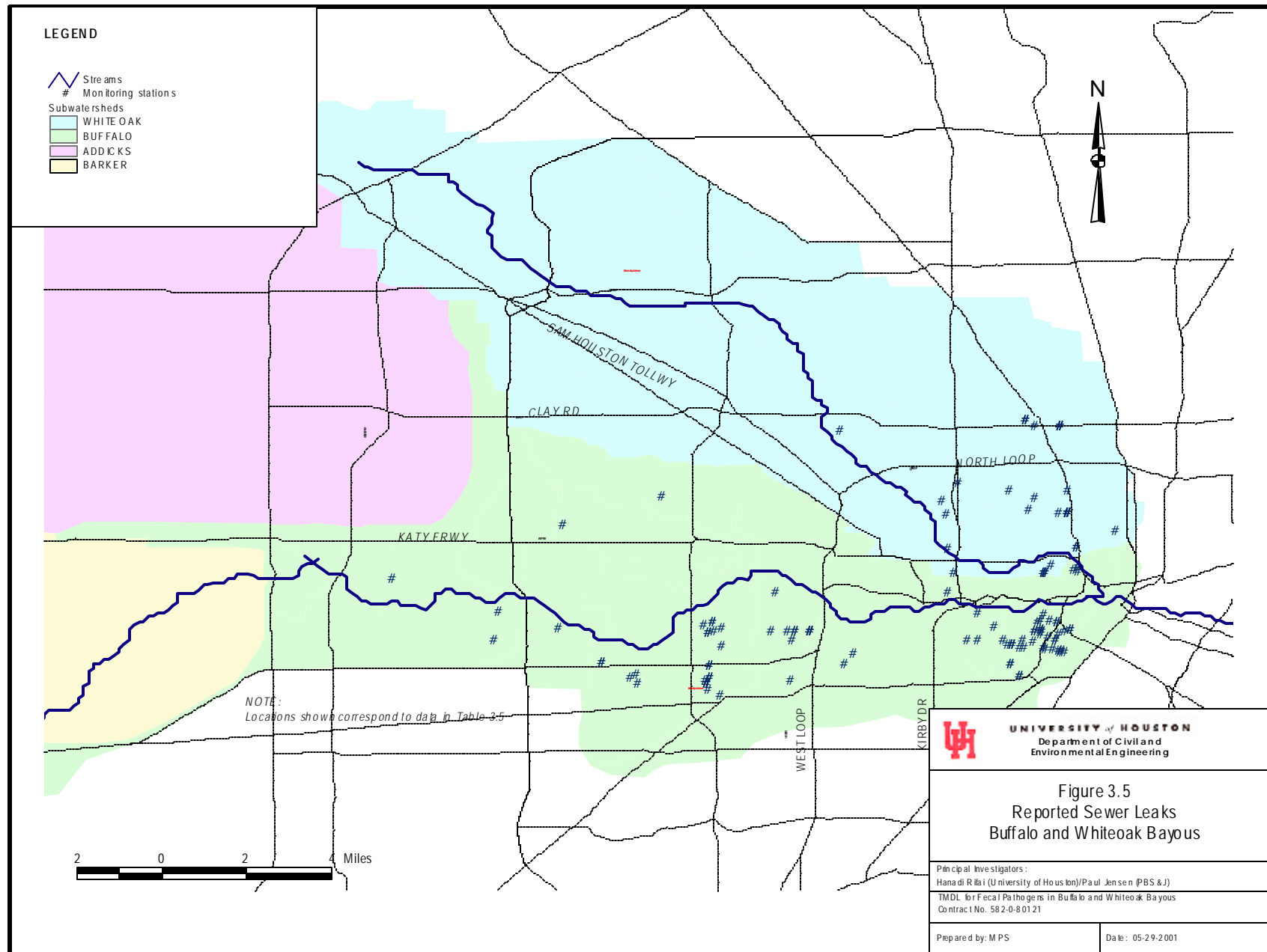


TABLE 3.6 FECAL COLIFORM LOAD FROM UNTREATED DISCHARGES

Bayou	Total volume bypasses, leaks and overflows (gal) ¹			Conc of dissolved sewage (cfu/100mL) ²	FC load from untreated discharges (cfu) ³		
	1998	1999	2000		1998	1999	2000
Buffalo	417,868	701,792	1,735,818	500,000	7.908E+12	1.328E+13	3.285E+13
Whiteoak	154,881	407,495	701,435	500,000	2.931E+12	7.712E+12	1.327E+13

Notes:

¹ Total volume calculated by adding the volume of all the reported overflows, leaks and bypasses for each year (Appendix II)

² Jensen, 1992 (GBNEP-21)

³ Calculated by multiplying the total volume for each year by the concentration of dissolved sewage

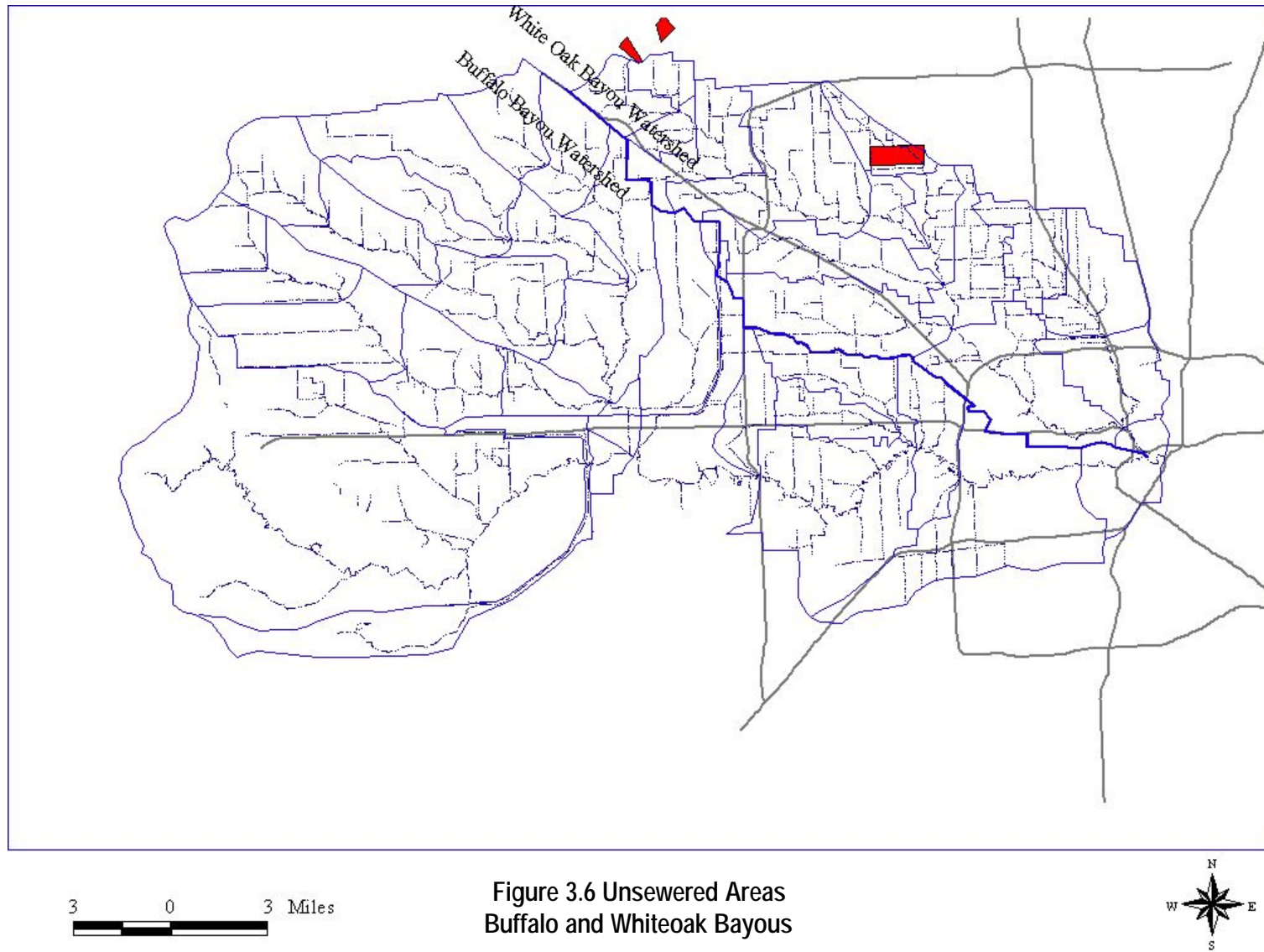
overflows. The calculated loads range from 2.93×10^{12} and 3.28×10^{13} between 1998 and 2000.

The common element to both dry weather sewer leaks and illicit discharges is that they result in flows to the stormwater system in dry weather that are transported to the bayous. These discharges enter to the bayous during a time when high concentrations of bacteria have been documented. Addressing these discharges and assessing their size and relevance to the overall problem is possible by monitoring storm drains near the point where they enter the bayous, as will be seen in the monitoring section of the report.

3.3.4 Discharge from Un-Sewered Areas

Although most of metropolitan Houston is served by sanitary sewer systems, there are still small areas within the watersheds that are on on-site systems. Sewage discharged from failed on-site systems may enter the stormsewers and increase the FC levels in receiving bayous.

The Houston-Galveston Area Council (H-GAC, 1999) has conducted a study that provided background information on 26 areas of concern previously identified by an earlier 319(h) Nonpoint Source Project. While these areas are not all unsewered and there are probably hundreds of unsewered locations in the region that have had some type of trouble with conventional septic systems, these 26 areas represent the worst cases of problem on-site systems. Among the 26 areas identified, as shown in Figure 3.6, three areas (#21- Recreation Farms; #24-Timber Lake Estates; and #25-Tower Oaks) appeared to be in the Whiteoak bayou watershed. However, on closer examination, two of the three are actually in the Cypress Creek watershed. Only Recreation Farms is in the study area.



Most of this area was reported to have adequate lot size for on-site systems, but several trailer parks and apartments were noted to need additional land area for alternative systems. Several alternatives for these situations were described.

The net effect at this time appears to be that with only one area identified in the watersheds, failed on-site systems do not appear to represent a major source of bacteria loading to the two bayous. This conclusion may need to be modified if additional information becomes available.

3.3.5 Loadings from Upstream Sources

As discussed in the first quarterly report, the most upstream routine sampling stations on Buffalo and Whiteoak bayous are the ones on Barker Dam and Jones Road, respectively. Both stations show consistently high FC levels over time, indicating potential FC sources upstream.

For Buffalo Bayou, the area upstream of Barker Dam includes Barker Reservoir, the City of Katy and other small communities. Table 3.7 shows that there are 25 permitted wastewater outfalls upstream of Barker Dam with a total 09/98 – 08/99 self-reporting flow of 7.6 MGD. A good portion of this area is also served by septic systems.

For Whiteoak Bayou upstream of Jones Road Table 3.7 lists four permitted wastewater outfalls with a total 09/98 – 08/99 self-reporting flow of 3.2 MGD. Some of this area is served by on-site systems.

The main purpose of the Addicks and Barker reservoirs is flood control, and stormwater is stored in the reservoirs for extended period of time after a storm event. The stored stormwater is discharged to the bayous gradually, typically for several weeks

TABLE 3.7
WASTEWATER DISCHARGERS UPSTREAM OF MONITORING POINTS

Permit name	Permit number	Permitted flow (MGD)	'98-'99 Self-reported average flow (MGD)
<i>BUFFALO BAYOU DISCHARGERS UPSTREAM OF BARKER DAM</i>			
IGLOO PRODUCTS	02229-001	0.03	0.01
KATY	10706-001	3.45	1.27
WEST MEMORIAL MUD	11152-001	6.48	1.58
WILLIAMSBURG REGIONAL	11598-001	2.00	0.74
WESTON MUD	11632-001	0.10	0.03
CASTLEWOOD MUD	11883-001	1.37	0.47
MEMORIAL MUD	11893-001	3.00	1.19
GREEN TRAILS MUD	12289-001	0.99	0.51
FORT BEND CO MUD 034	12298-001	0.20	0.07
WEST PARK MUD	12346-001	0.50	0.19
HARRIS CO. MUD #345	12356-001	0.71	0.11
FORT BEND CO MUD 037	12370-001	0.18	0.11
COOPER CAMERON CORP	12412-001	0.01	0.00
NOTTINGHAM COUNTRY MUD	12479-001	1.30	0.40
HARRIS-FORT BEND COS MUD	12498-001	0.43	
HARRIS-FT BEND CO MUD	12805-001	0.25	0.02
HARRIS COUNTY-CULLEN	12858-001	0.03	0.01
CINCO MUD 001	13172-002	0.91	0.17
RLG REALTY HOLDINGS	13218-001	0.35	
FT BEND CO MUD 050	13228-001	0.70	0.04
GRAND LAKES MUD #4	13245-001	0.90	0.02
CINCO MUD 001	13558-001	1.69	0.64
NOTTINGHAM COUNTRY MUD (W	13674-001	0.05	0.03
HOUSTON AREA DEVELOPMENT	13775-001	0.25	0.03
GINTER REAL ESTATE	14011-001	0.15	
Total flow		26.03	7.64
<i>WHITE OAK BAYOU DISCHARGERS UPSTREAM OF JONES ROAD</i>			
HARRIS CO FWSD 061	10876-001	1.60	0.95
HARRIS CO FWSD 061	10876-002	3.00	1.28
HARRIS CO MUD 170	12121-001	2.50	0.94
TIFCO INDUSTRIES	12465-001	0.04	0.01
Total flow		7.14	3.18

after a significant event. Therefore, the sources of this upstream and background FC are most likely to include stormwater and discharges from domestic outfalls and septic systems. More targeted monitoring may be necessary to identify any specific source upstream of these stations.

3.3.6 Bacteria from Birds at Bridges

In the recent Bacterial Indicator Study (PBS&J, 2000) some indications of significant avian contributions to surface waters were noted. Data collected by the Upper Guadalupe River Authority documented levels under major bridges that routinely exceeded contact recreation criteria by a substantial margin. Exhaustive searches revealed no wastewater sources and levels away from the bridges were markedly lower. There were high bird populations living along and under the bridges leading the UGRA staff to conclude they were the most likely source of the high concentrations observed.

Another finding of the study was that direct measurement of fecal matter mixed in a standard concentration with buffered laboratory water found pigeon droppings to be relatively high in indicator bacteria. Levels were comparable with dogs, and markedly higher than cat or horse droppings.

Whether birds (or other wildlife) can make a significant difference in the Houston bayous is unknown. However, essentially all of the data in the area are obtained by sampling from bridges, and bridges do tend to support substantial bird populations. Further investigation of this contribution may be warranted.

3.3.7 Bacteria from Runoff

Runoff has long been documented to be high in bacteria. The precise reasons have not been defined in many cases. Newell *et al.* (1992) calculated FC loads to Galveston Bay from Buffalo and Whiteoak Bayous. Table 3.8 summarizes the calculated loadings for FC as well as runoff volumes for an average year and includes the event mean concentrations used in the calculation. The data in Newell *et al.* (1992) are useful for describing the magnitude of the overall non-point source contribution. However, and because of the dynamic nature of runoff events, additional non-point data collection and calculation would be needed for this TMDL.

As described in the first quarterly report (University of Houston and PBS&J, 2000a), many of the bayou data were collected when flows were above the median level. In theory, the difference between high- and low-flow FC data would be the runoff loads. However, as shown in Figures 3.2 and 3.3, this may not be a straightforward calculation. Also, as described above, the Barker and Addicks reservoirs store stormwater during storm events and discharge the water for an extended period of time after the events. Therefore, a precise divide between dry- and wet-weather flows is hard to define.

Statistical analysis of the moderate- and high-flow FC datasets for selected monitoring stations showed that the two datasets were not significantly different (section 2.2.3). This confirms the earlier assessment that it would be difficult to isolate the contribution of non-point sources by looking at FC data for high flows.

In addition to the FC data collected during high flows, as those reported in the first quarterly report, there are other sets of runoff data. As a part of the MS4 permit requirements, the City of Houston, Harris County and TxDOT have been collecting wet-

TABLE 3.8 AVERAGE YEAR TOTAL NON-POINT SOURCE LOADS

Watershed	Subwatershed	Area (sq mi)	Runoff volume (thousands acre-ft)^a	Average year FC Concentration (cfu/dl)	Total NPS load (x10¹⁵ cfu)
Buffalo	BF01	40.13	33		7
	BF02	29.43	34		9
	BF03	16.57	20		5
	BF04	8.05	12		3
	BF05	10.72	17		4
	Total	104.9	116	19,178	27
Whiteoak	WO01	43.98	45		9
	WO02	11.35	14		3
	WO03	23.66	29		7
	WO04	21.25	26		6
	WO05	10.09	14		4
	Total	110.33	128	18,332	29

^a Case 1-Average annual rainfall

Source: Newell et al., 1992 (GBNEP-15)

weather samples from selected watersheds and analyzing them for bacteria and other parameters. Table 3.9 lists data collected in the last year as part of the program. The values shown are grab samples collected during runoff events. Most samples show high bacteria levels, in general agreement with other runoff data.

As part of an effort to quantify the effect of Sanitary Sewer Overflows (SSO), the City undertook a major effort to monitor stormsewers upstream and downstream of known overflow locations (Espey Huston and Associates Inc., 1994a). Table 3.10 lists the sampling stations monitored. At each site there is a stormsewer manhole upstream (U) and downstream (D) of a known overflow point. Five rain events were sampled at the ten sites (U&D) and the data are presented in Table 3.11. The composite samples were obtained by mixing individual samples in proportion to the flow that was estimated from the water level in the manhole. Bacteria analyses were performed by Dr. Ernst Davis of the UT School of Public Health.

One of the expectations of the study was that a systematic increase in bacteria concentrations could be found downstream of the SSOs, and that this increase could be used to quantify the impact on bayou water quality. This expectation was not met. Taken together, the data indicated higher concentrations on average in the upstream locations than downstream (Espey Huston and Associates Inc., 1994a). It was concluded that a combination of the high overall concentrations and large variability in stormwater bacteria data with no overflows, combined with the relative rarity of overflow events made the SSO “signal” too weak to detect above the background noise. A separate modeling analysis (Espey Huston and Associates Inc., 1994b) indicated that the SSO contribution was far too small to be detected by monitoring.

TABLE 3.9
STORMWATER BACTERIA DATA COLLECTED FOR MS4 PERMIT ¹

Sampling site	Site location	Sampling date	Fecal Coliform (mpn/dL)	Fecal Streptococci (mpn/dL)	Enterococci (mpn/dL)
<i>BUFFALO BAYOU WATERSHED</i>					
Tanglewilde	Manhole on Tanglewilde approximately 600 ft north of Ella Lee, near a 30 ft ditch draining to the east.	2/17/99	16,000	> 16,000	
		3/12/99 ²	140	> 16,000	130
		4/14/99	90,000	90,000	90,000
Memorial City Mall	Manhole in the parking lot of Memorial City Mall, approximately 600 ft east-southeast of the corner of Gessner and the I-10	2/20/99	9,000	> 16,000	
		4/14/99	7,000	28,000	17,000
<i>WHITE OAK BAYOU WATERSHED</i>					
Lazybrook	Former USGS substation east side of West T.C. Jester across from Lazybrook Drive.	2/17/99	16,000	> 16,000	
		3/19/99	50,000		90,000
Eleventh Street	Manhole on south side of West Eleventh Street, approximately 500 ft west of Ella Blvd.	1/28/99 ²	270	500	1
		3/13/99	140	> 16,000	9,000
		3/19/99	1,700		13,000
Steeplechase	Manhole located on Bridgedown Drive approximately 700 ft west of Jones Road in the Steeplechase Corners Shopping Center.	2/11/99	5,500		< 2
		6/15/99	260,000	350,000	90,000

Source: Annual Report for National Pollutant Discharge Elimination System Permit No. TXS001201, Reporting Period: October 1, 1998 - July 31, 1998.
City of Houston/Harris County/Harris County Flood Control District/Texas Department of Transportation Storm Water Management Joint Task Force

¹ All values are grab samples.

² Event did not meet the EPA criterion that requires the minimum rainfall amount to be 0.10 in.

TABLE 3.10
SAMPLING LOCATIONS FOR SSO IMPACT STUDY

Site No.	Location
143-018U	Rosslyn Road @ Ebony Lane
143-018D	Rosslyn Road between W. 34th Street and the railroad
143-019U	Ella Blvd. @ East T.C. Jester Blvd.
143-019D	East T.C. Jester Blvd. east of Ella Blvd.
143-030U	W. 14th Street @ Herkimer Street
143-030D	W. 14th Street @ Alexander Street
143-037U	Hamilton Street @ Tidwell Road
143-037D	Hamilton Street @ Whiteoak Bayou (east of Harvard Street)
143-042U	W. 6th Street @ Leafton Street (north side)
143-042D	600 N. Shepherd Drive (parking lot between 6th Street and White Oak Bayou)
143-043U	Center Street @ Silver Street
143-043D	White Street @ Memorial Drive
143-047U	Paschall Street @ Keene Street
143-047D	Paschall Street @ Marie Street
143-065U	Detering Street @ Floyd Street
143-065D	Detering Street @ Lacy Street
143-090U	W. 13th Street @ Tulane Street
143-090D	Yale Street @ W. 7th Street
237-010U	Brittmore Road @ Perthshire Road
237-010D	Memorial Drive @ Rummel Creek

Source: Analysis of Sanitary Sewer Overflows Effects on Surface Water Quality
Volume II Monitoring Overflow Effects on Urban Runoff
Espey, Huston & Associates, Inc., 1994.

TABLE 3.11
SSO STORMWATER BACTERIA DATA

Date	Site ¹	Fecal coliform (cfu/dL)				E. Coli (cfu/dL)				Fecal Streptococci (cfu/dL)				Enterococci (cfu/dL)			
		Upstream (U) ²		Downstream (D) ²		Upstream (U) ²		Downstream (D) ²		Upstream (U) ²		Downstream (D) ²		Upstream (U) ²		Downstream (D) ²	
		Composite	Grab	Composite	Grab	Composite	Grab	Composite	Grab	Composite	Grab	Composite	Grab	Composite	Grab	Composite	Grab
5-05-93	143-018																
5-23-93	143-018	29,000	> 50,000	< 1	500	22,000	500	< 1	< 1	4,300	485	180	60	4,950	2,400	500	520
6-19/20-93	143-018	12,000	15,000	4,400	2,000	4,000	2,000	600	1,000	900	1,100	300	500	300	700	100	100
10-20-93	143-018	19,500	30,000	115,000	4,000	5,000	15,000	60,000	2,000	9,000	11,000	18,000	17,500	< 1	4,000	6,500	6,000
11-16-93	143-018	245,000	310,000	340,000	450,000	130,000	6,500	140,000	25,000	107,500	131,500	48,500	49,500	24,000	17,000	14,500	26,500
5-05-93	143-019		150	> 38,000			< 1	19,000			500	3,350			< 1	1,000	
5-23-93	143-019																
6-19/20-93	143-019			1,000	7,000			< 1	3,000			350	420			550	< 1
10-20-93	143-019																
11-16-93	143-019	6,000	3,000	960,000	910,000	< 1	2,000	360,000	3,000	9,500	4,500	59,000	76,000	4,000	2,500	53,000	55,000
5-05-93	143-030																
5-23-93	143-030																
6-19/20-93	143-030																
10-20-93	143-030	2,000		1,500		1,500		500		3,500		8,000		1,000		< 8,000	
11-16-93	143-030	270,000	480,000	305,000	540,000	105,000	250,000	120,000	230,000	26,500	35,500	51,000	59,500	< 26,500	24,000	41,000	21,500
5-05-93	143-037	350				150				200				< 1			
5-23-93	143-037		< 1		100		< 1		50		< 1		5		50		105
6-19/20-93	143-037		1,000		1,000		200		1		200		100		100		12
10-20-93	143-037	12,000	13,500	14,000	12,000	10,500	10,000	13,500	8,500	3,000	9,000	2,500	4,500	< 1	< 1	< 2,500	500
11-16-93	143-037																
5-05-93	143-042																
5-23-93	143-042		50		100		< 1		50		35		100		200		95
6-19/20-93	143-042		2,000		500		200		200		60		50		20		< 1
10-20-93	143-042	3,000	1,500	1,000	500	500	< 1	1,000	< 1	< 1	4,000	2,500	1,500	2,000	500	1,000	500
11-16-93	143-042	43,000	190,000	23,000	13,500	6,500	20,000	16,000	6,500	22,000	20,500	11,500	14,500	6,500	4,000	2,500	5,000
5-05-93	143-043			11,000				1,750				< 1				< 1	
5-23-93	143-043				6,000				< 1			30					130
6-19/20-93	143-043																
10-20-93	143-043	< 1		15,500		< 1		15,000		< 1		11,000		500		2,000	
11-16-93	143-043																
5-05-93	143-047																
5-23-93	143-047	2,500	1,000	3,000	100	750	500	200	< 1	250	95	300	15	170	600	2,500	125
6-19/20-93	143-047	200	200		100	100	< 1		100	90	500		1,000	50	< 1		< 1
10-20-93	143-047																
11-16-93	143-047	#####	250,000	50,000	100,000	210,000	50,000	40,000	50,000	28,000	24,000	21,000	56,000	< 28,000	13,000	21,000	28,000
5-05-93	143-065	8,500		4,050		2,000		2,000		< 1		650		< 1		< 1	
5-23-93	143-065																
6-19/20-93	143-065																
10-20-93	143-065			45,000	45,000			40,000	40,000			17,500	19,500			8,500	11,000
11-16-93	143-065																
5-05-93	143-090																
5-23-93	143-090		4,000		2,000		< 1		< 1		215		20		1,400		300
6-19/20-93	143-090		550		2,000		300		< 1		200		190		45		100
10-20-93	143-090	22,500	39,000	19,500	6,500	15,000	5,000	5,000	5,500	8,500	4,000	6,000	5,500	1,500	< 4,000	1,500	1,500
11-16-93	143-090		99,500	44,500			10,000	31,000			32,000	25,000			< 32,000	23,000	
5-05-93	237-010																
5-23-93	237-010		250		550		< 1		< 1		10		30		135		65
6-19/20-93	237-010		1,000	100	1,650		100	50	1,000		160	110	300		30	90	200
10-20-93	237-010	30,000	50,000	44,000	31,000	30,000	15,000	19,000	17,500	24,000	16,000	15,500	17,500	10,500	10,500	7,500	12,000
11-16-93	237-010	150,000	145,000	210,000	170,000	105,000	30,000	50,000	50,000	45,000	27,000	35,000	22,000	28,000	13,000	19,000	20,000

Source: Analysis of Sanitary Sewer Overflows Effects on Surface Water Quality, Volume II Monitoring Overflow Effects on Urban Runoff, Espey, Huston & Associates, Inc., 1994.

¹ See Table 2-6 for site locations.² Upstream/downstream of sanitary sewer overflow locations.

Another set of high flow data in study area bayous was collected by the USGS in 1993-1994. Table 3.12 lists the results of the sampling effort. FC levels during the high bayou flows were approximately ten times higher than in dry weather.

While runoff may be the most significant source of bacteria in Buffalo and Whiteoak bayous, its impact when bayou flows are low enough to support contact recreation is yet to be determined. Monitoring of smaller runoff events may be needed to address this issue.

3.3.8 Bacteria from Stream Sediments

Stream sediments contain bacteria that have shown positive on both the FC and EC tests (PBS&J, 2000). A review of the general literature indicated that the levels of FC and other pathogens are higher in sediments than in the overlying water column. Furthermore, it has been shown that sediments present appropriate conditions for an extended survival of bacteria. It is possible that such sediments function as a reservoir for bacteria, maintaining a near continuous source to the water through resuspension. To understand this possible mechanism will require field and laboratory monitoring, as described in the monitoring plan section of the report.

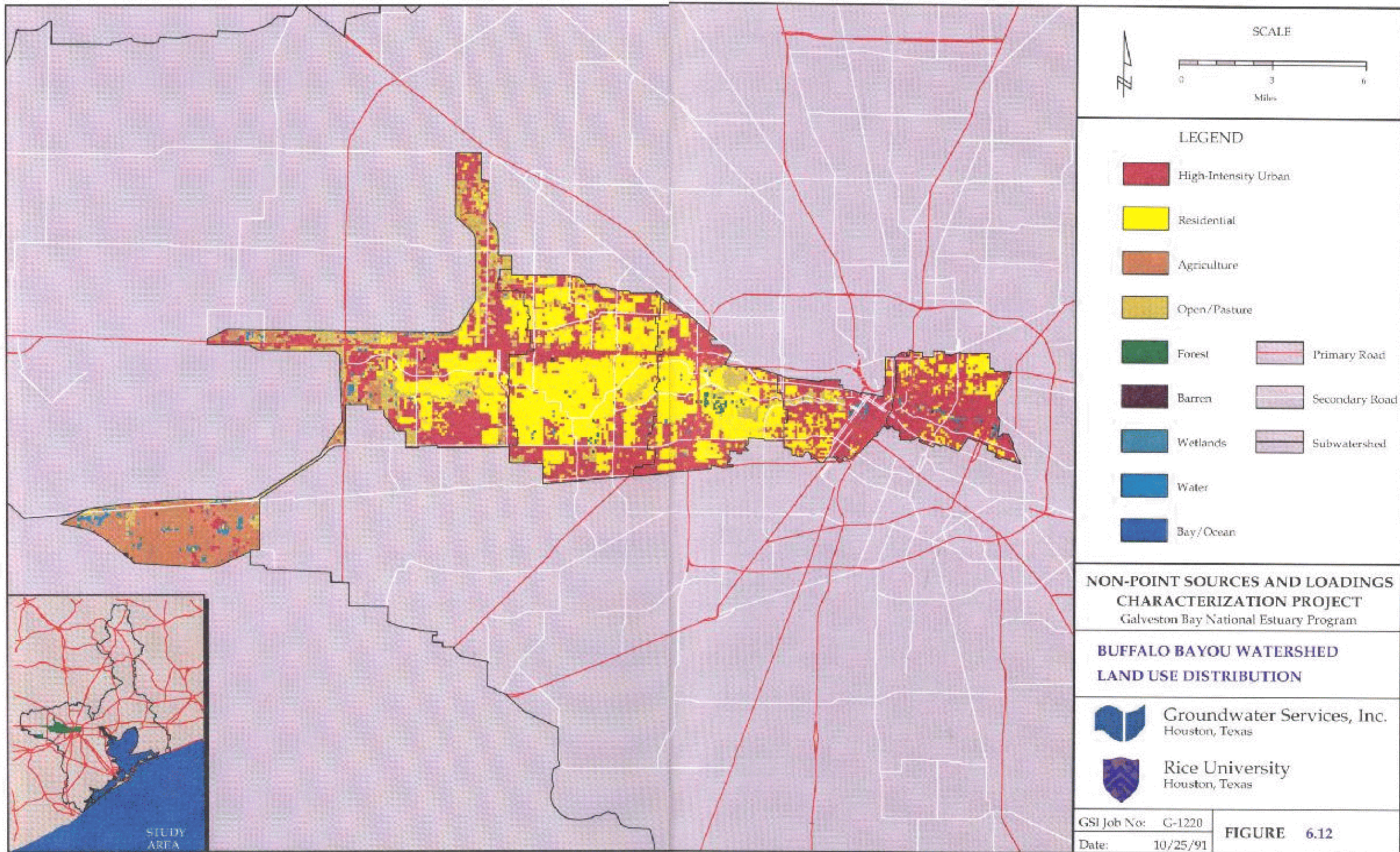
3.3.9 Relationships between Observed Fecal Coliform Levels and other Factors

Figures 3.7 and 3.8 show land use from the GBNEP non-point source study for Galveston Bay (Newell *et al.*, 1992). Both figures show the watersheds are mostly urban with some agriculture/open/pasture areas in the upper watersheds. The GBNEP study also included land use maps for Addicks and Barker Reservoirs (Figures 3.9 and 3.10). The

TABLE 3.12
HIGH FLOW DATA IN BAYOUS COLLECTED BY USGS

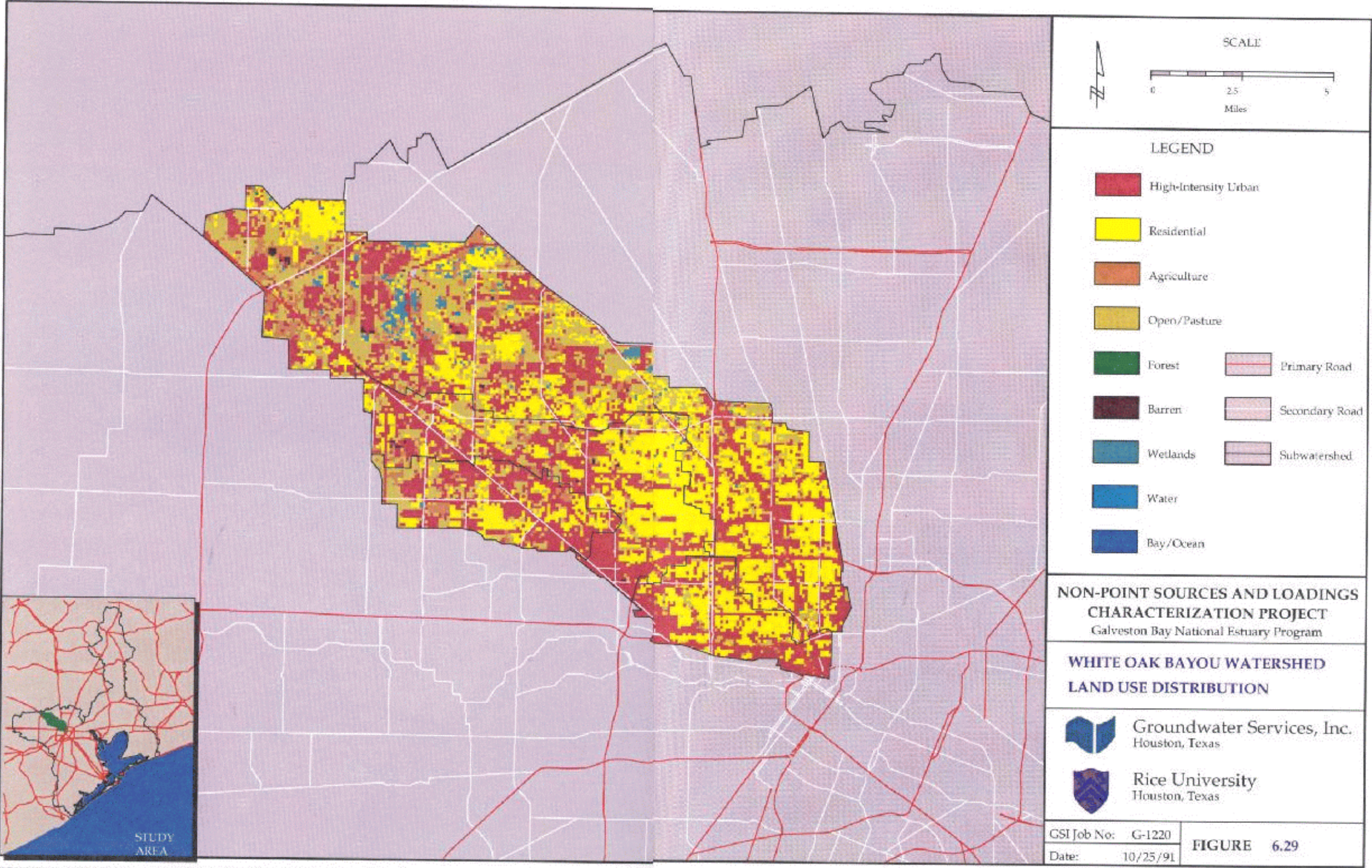
DATE	Flow (cfs)	Fecal coliform (cfu/dL)	Fecal Streptococci (cfu/dL)	DATE	Flow (cfs)	Fecal coliform (cfu/dL)	Fecal Streptococci (cfu/dL)	DATE	Flow (cfs)	Fecal coliform (cfu/dL)	Fecal Streptococci (cfu/dL)
BUFFALO BAYOU AT SHEPHERD DRIVE				BUFFALO BAYOU AT MCKEE STREET				WHITE OAK BAYOU AT MAIN STREET			
May 5 - 6, 1993				May 5 - 6, 1993				May 5 - 6, 1993			
5/5/93 11:20	476	6,700	18,000	5/5/93 11:26	1,800	920	2,200	5/5/93 11:05	500	700	2,800
5/5/93 13:35	925	8,700	19,000	5/5/93 11:49	2,500	19,000	25,000	5/5/93 12:12	520	6,000	50,000
5/5/93 15:22	1,100	9,300	25,000	5/5/93 13:22	3,850	55,000	46,000	5/5/93 14:52	1,950	17,000	60,000
5/5/93 23:10	1,290	23,000	30,000	5/5/93 16:16	4,400	35,000	32,000	5/5/93 17:12	1,470	31,000	62,000
5/6/93 1:10	1,200	20,000	27,000	5/5/93 20:17	3,400	26,000	54,000	5/5/93 20:18	1,300	38,000	84,000
5/6/93 13:47	806	9,300	20,000	5/6/93 2:29	1,880	13,000	41,000	5/6/93 0:03	1,000	26,000	35,000
May 23 - 24, 1993				May 23 - 24, 1993				May 23 - 24, 1993			
5/23/93 12:45	325	2,900	39,000	5/23/93 13:16	2,350	3,100	2,600	5/23/93 13:10	600	2,100	9,300
5/23/93 13:55	482	3,300	7,700	5/23/93 15:15	1,950	30,000	11,000	5/23/93 14:46	610	25,000	34,000
5/23/93 18:44	656	10,000	15,000	5/23/93 18:52	3,500	41,000	30,000	5/23/93 19:21	1,820	39,000	41,000
5/24/93 7:00	1,690	25,000	41,000	5/23/93 21:06	5,900	52,000	40,000	5/23/93 21:30	2,300	55,000	52,000
5/24/93 8:46	1,450	34,000	25,000	5/23/93 23:23	5,300	31,000	36,000	5/23/93 22:50	1,820	29,000	40,000
5/24/93 10:35	1,090	12,000	24,000	5/24/93 1:23	2,800	25,000	31,000	5/24/93 0:30	1,550	31,000	42,000
June 19 - 21, 1993				June 20 - 21, 1993				June 19 - 21, 1993			
6/19/93 23:48	4,260	7,000	35,000	6/20/93 0:55	11,500	3,900	38,000	6/19/93 23:55	4,700	1,000	21,000
6/20/93 2:55	5,280	16,000	41,000	6/20/93 4:48	10,700	11,000	120,000	6/20/93 3:35	5,200	4,400	25,000
6/20/93 6:00	5,760	29,000	65,000	6/20/93 7:38	12,400	14,000	48,000	6/20/93 9:14	5,100	8,300	20,000
6/21/93 8:35	4,160	1,000	7,000	6/20/93 10:03	13,000	26,000	44,000	6/20/93 11:22	5,400	15,000	32,000
6/21/93 14:20	2,160	8,000	3,800	6/21/93 10:28	5,000	2,000	9,000	6/20/93 9:57	1,650	3,600	9,300
6/21/93 19:06	1,270	11,000	3,100	6/21/93 17:40	2,480	5,800	9,700	6/21/93 17:35	1,620	5,400	11,000

Source: Analysis of Sanitary Sewer Overflows Effects on Surface Water Quality, Volume III Overflow Modeling and Effects Quantification, Espey, Huston & Associates, Inc., 1994.



SOURCE: LANDSAT imagery taken November, 1990. Interpretation performed by Intera Aero Service.

Figure 3.7 Buffalo Bayou Watershed Land Use (from GBNEP-15)



SOURCE: LANDSAT imagery taken November, 1990. Interpretation performed by Intera Aero Service.

Figure 3.8 Whiteoak Bayou Watershed Land Use (from GBNEP-15)

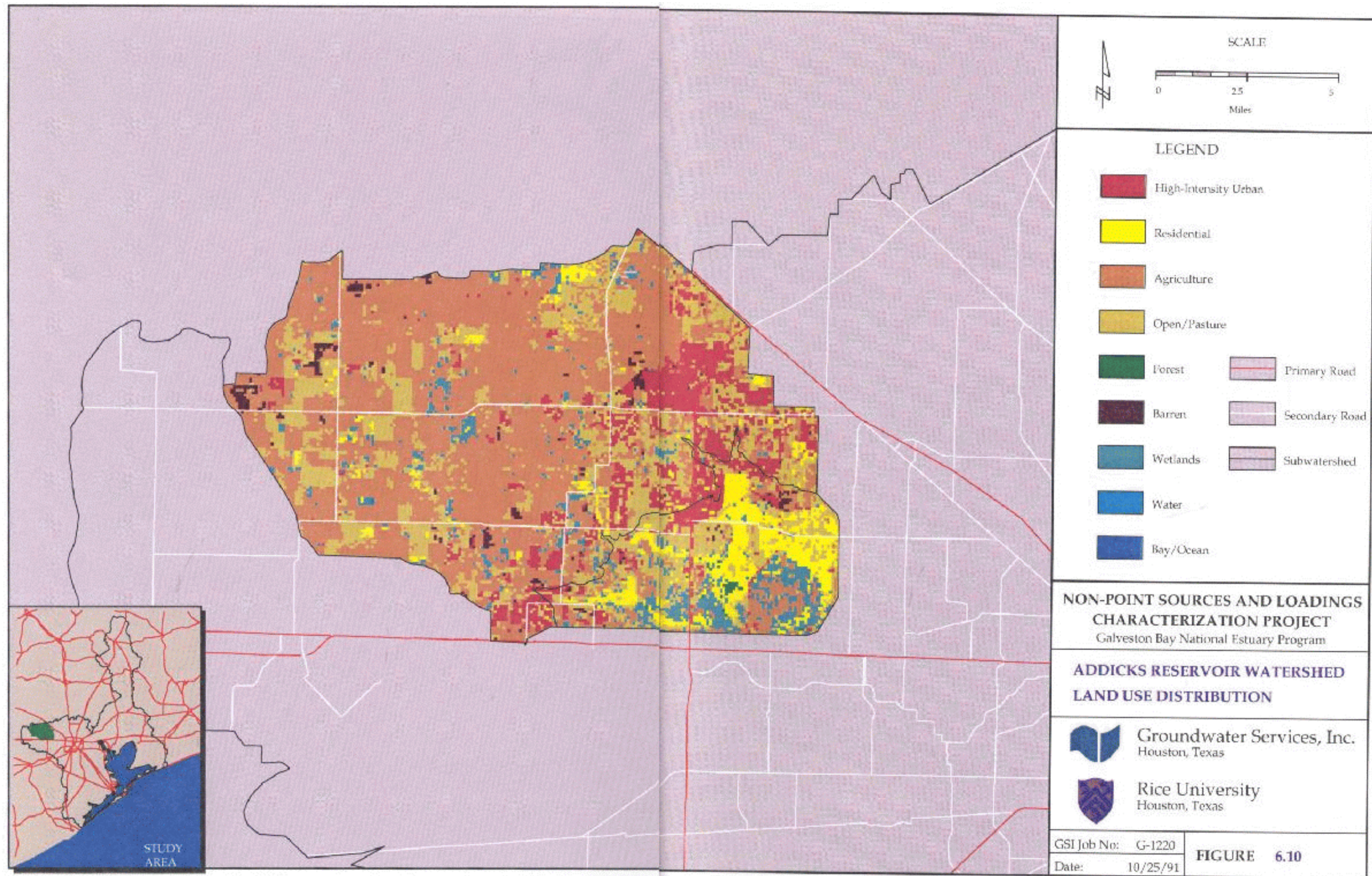
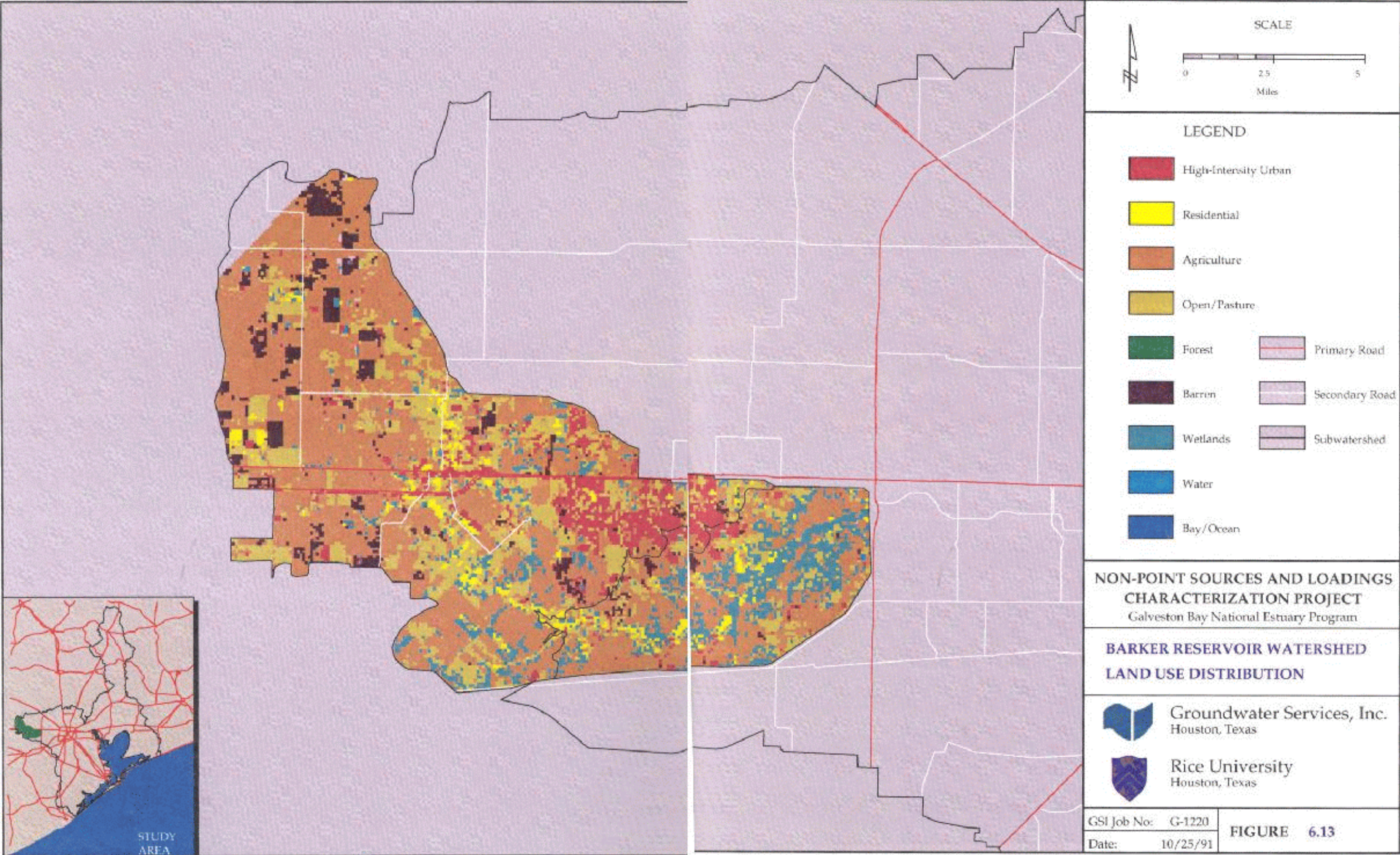


Figure 3.9 Addicks Reservoir Watershed Land Use (from GBNEP-15)



SOURCE: LANDSAT imagery taken November, 1990. Interpretation performed by Intera Aero Service.

Figure 3.10 Barker Reservoir Watershed Land Use (from GBNEP-15)

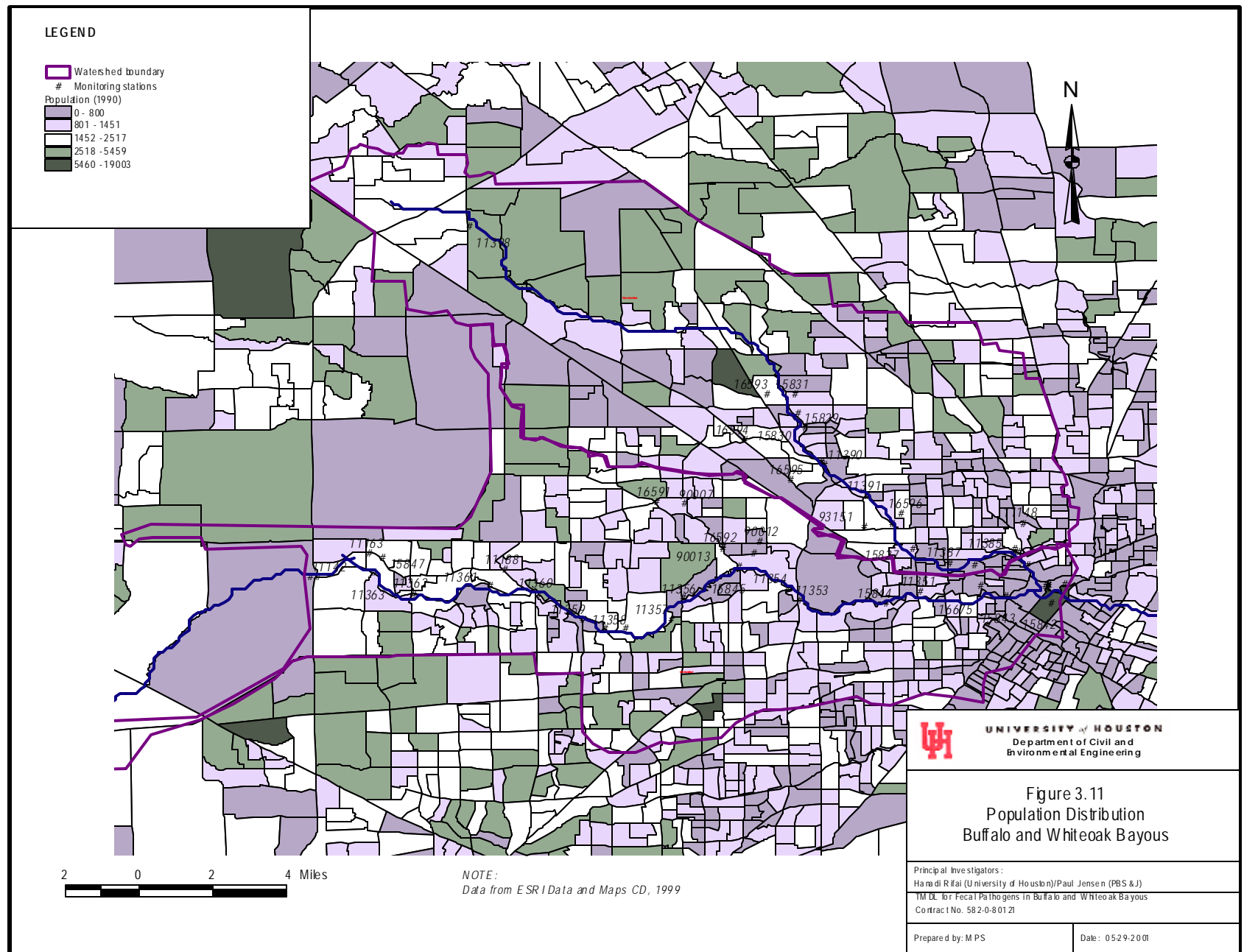
land use in the two reservoirs seems to be predominantly agriculture/open/pasture. It is noted that the GBNEP data are from 1990 and may require updating for use in this project. An analysis of the correlation between land use patterns and observed FC levels in the bayous is underway.

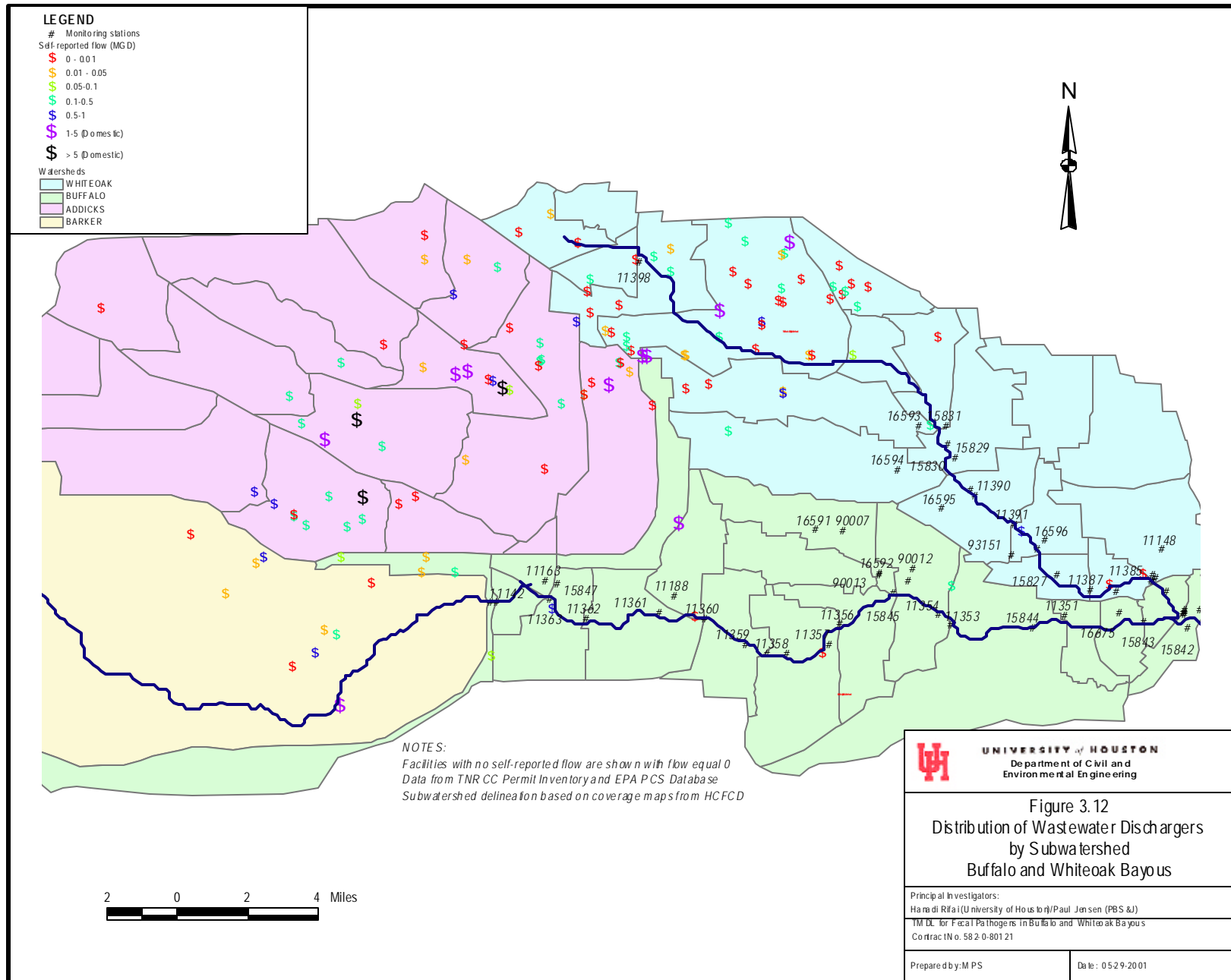
In addition to land use patterns, population data were gathered. The data in Figure 3.11 show the population distribution for the study area. An analysis of possible correlation between population and observed FC levels is underway.

Figure 3.12 shows the location of dischargers to Buffalo and Whiteoak Bayous on a subwatershed basis. It can be seen in Figure 3.12 that a significant number of major dischargers are located in the Addicks Reservoir and in the upper part of Whiteoak Bayou, which suggests that FC levels in the bayous are very influenced by upstream sources, as discussed earlier in this report. The first monitoring stations in both Whiteoak and Buffalo Bayous include the effect of PS dischargers upstream (high FC values as shown by the monitoring data). The Addicks Reservoir, however, is classified as agricultural land (see Figure 3.9) and not as urban area. There is an area within Addicks Reservoir that is highly populated (8137) and two with moderate population (3334 and 2170), that explains the location of numerous WWTPs in an area classified as agricultural land.

3.3.10 Relative Importance of the Major Sources of Fecal Coliform to the Bayous

An evaluation of the relative importance of point sources (PS), non-point sources (NPS), and overflows from a loading perspective showed that the non-point sources are the major contributor of fecal coliform to Buffalo and Whiteoak Bayous. As shown in Figure 3.13, the NPS loads are one order of magnitude greater than those from PS and up





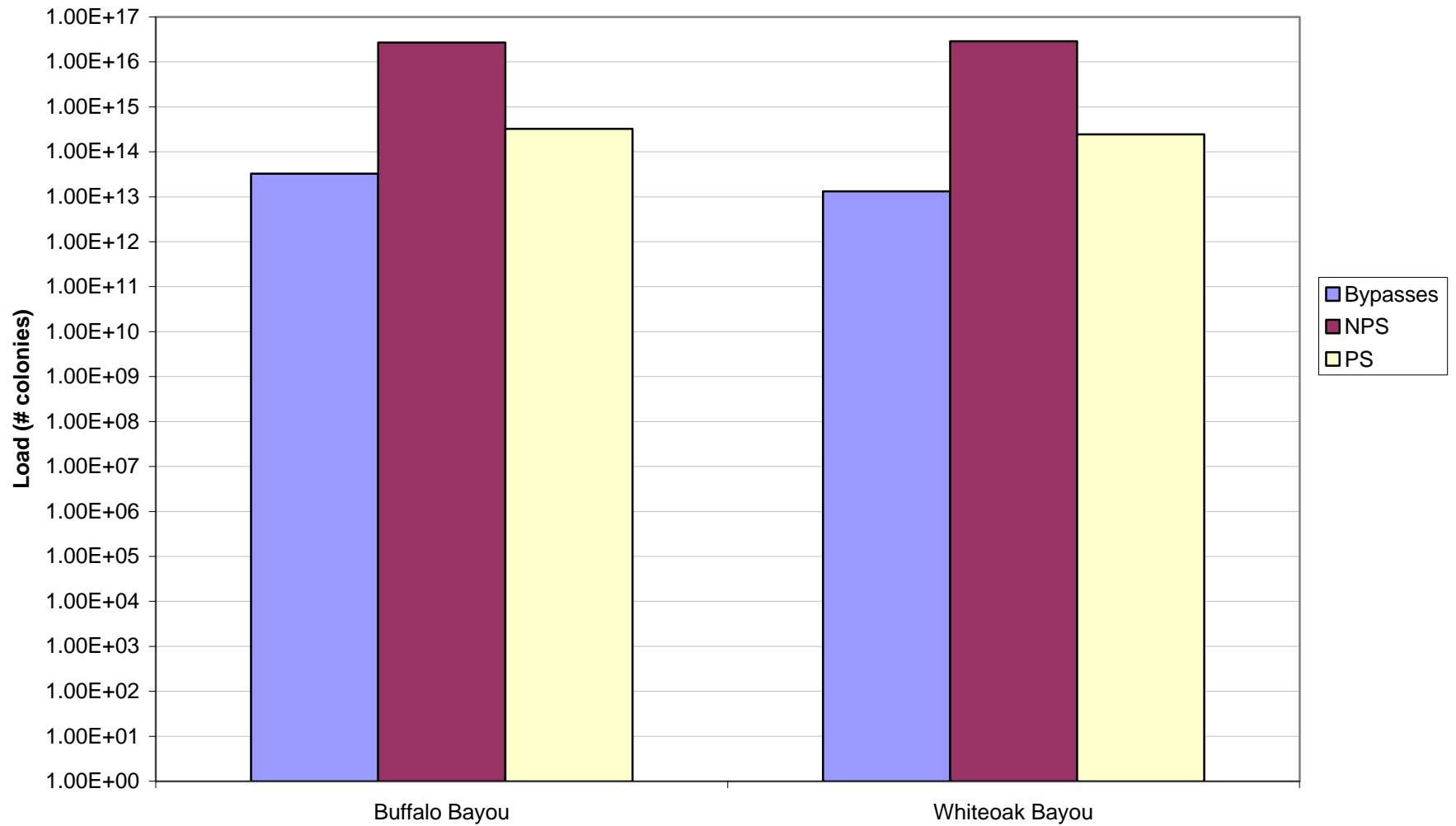


FIGURE 3.13 Contribution to FC load by source type (data from year 2000)

to three orders of magnitude greater than the loads from overflows and bypasses. However, it should be kept in mind that runoff is a shorter term dynamic phenomenon that affects FC conditions in the bayou on an intermittent basis.

3.3.11 Assessment of TMDL Curves

The Kansas TMDL Curve Methodology (KDHE, 1999) was followed to determine the issues surrounding the high bacteria levels at the Buffalo and Whiteoak Bayous and to differentiate between point and nonpoint sources. The TMDL Curve is a plot of the concentration of fecal coliform per day vs. the percent of days the load is exceeded at a specific monitoring station. Those points above the curve represent violations to the water quality standard, while the points below the curve represent compliance with the standards. The methodology followed to build the TMDL curves for the project area is described below (KDHE, 1999).

1. Development of a flow duration curve for the gages located in Buffalo and Whiteoak Bayous (average daily flow values were used for this purpose).
2. Multiplication of the daily flows by the FC standard (200 cfu/day) and by a conversion factor to obtain a Load Duration (TMDL) Curve (i.e. daily load in cfu/day vs. percent days load exceeded).
3. Conversion of a FC concentration to a load by multiplying it by the flow measured when the sample was taken. Then, these points are plotted on the TMDL Curve.
4. Loads that plot above the curve in the flow regime defined as being exceeded 85-99% of the time are likely indicative of point source impacts on the water quality. Those points that fall above the curve over the range 10-70% flow exceedance

likely reflect nonpoint contributions. Points falling above the curve over the transition zone (70-85% flow exceedance) represent a combination of point and nonpoint source contributions. Those plotting above the curve at exceedances less than 10% or more than 99% reflect extreme hydrologic conditions of flood or drought.

Figures 3.14 and 3.15 present the TMDL Curves for the different stations along Buffalo and Whiteoak Bayous. It is important to note that since data from only one gage in Buffalo Bayou (West Belt) were available, loadings at all stations were compared to the same TMDL Curve built with the average daily flow data from the West Belt station. There are two USGS gages in Whiteoak Bayou, therefore, two different TMDL curves were developed for this bayou and data at a given station were compared to the TMDL curve that corresponds to the closer USGS gage.

Data in Figures 3.14 and 3.15 show that the water quality standard is violated most of the time, with a few points falling above the TMDL curve for both Buffalo and Whiteoak Bayous. These load exceedances are up to three order of magnitude higher than the load that supports contact recreation for a given flow value. It can also be observed that for both bayous the load points are distributed all over the range 10-99% of flow exceedance, which makes it difficult to differentiate between point and nonpoint source impacts. There are also some points falling above the curve over the flow range 0.1-10%, which reflect effects of very high flow events. The needed load and wasteload reductions to meet contact recreation standards will be quantified in the future.

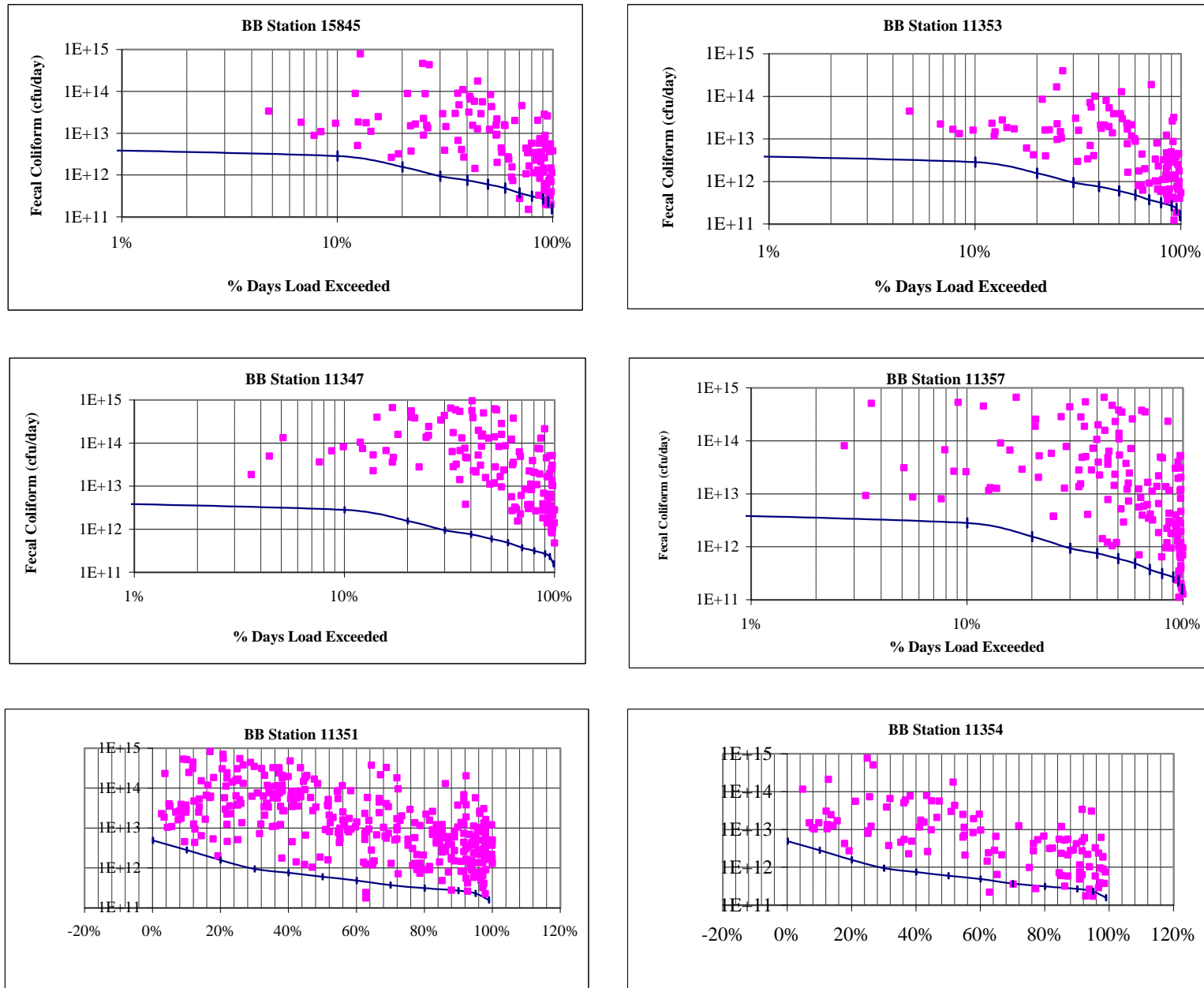


Figure 3.14 TMDL Curves for Buffalo Bayou

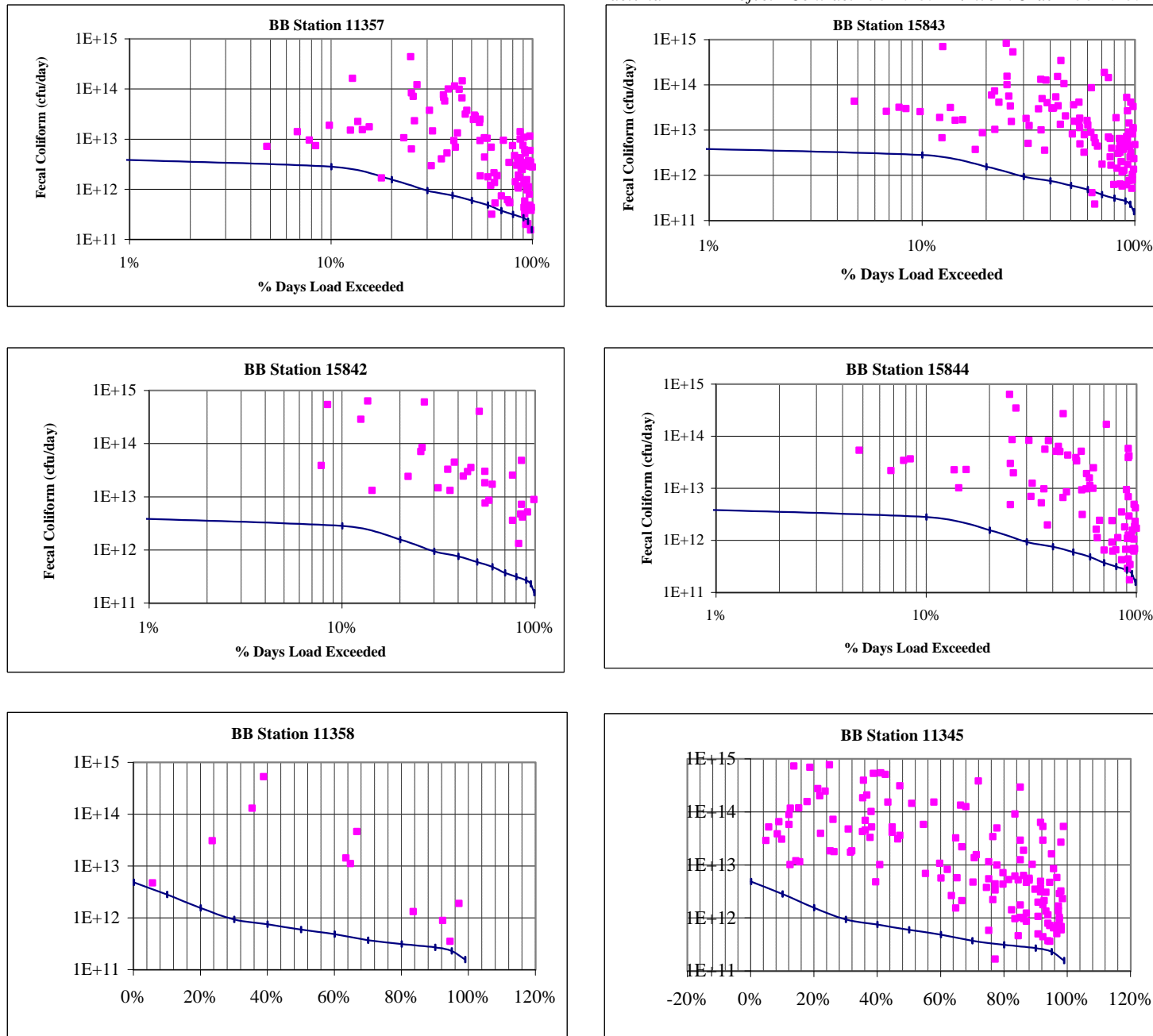


Figure 3.14 TMDL Curves for Buffalo Bayou (Continued)

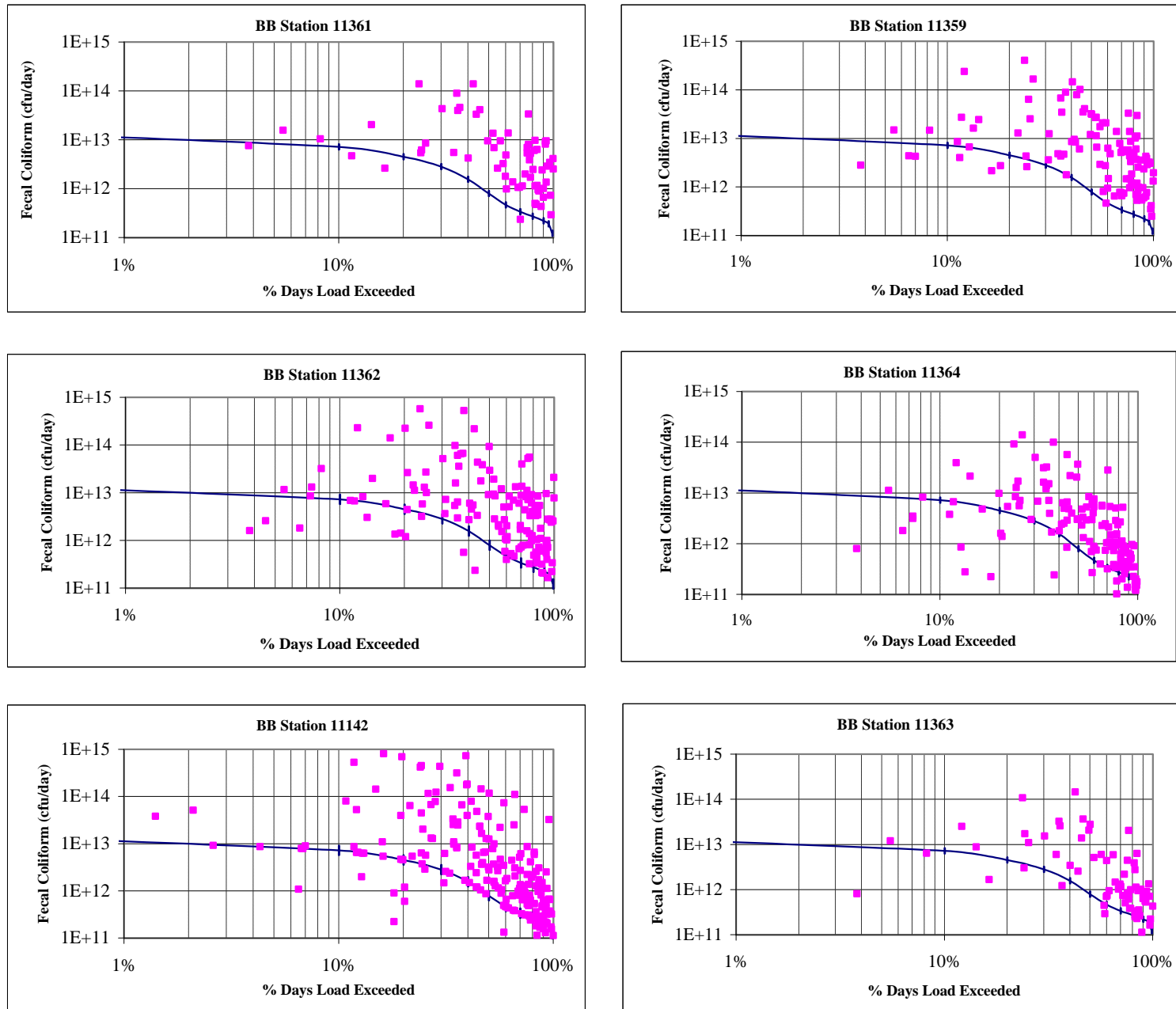


Figure 3.14 TMDL Curves for Buffalo Bayou (Continued)

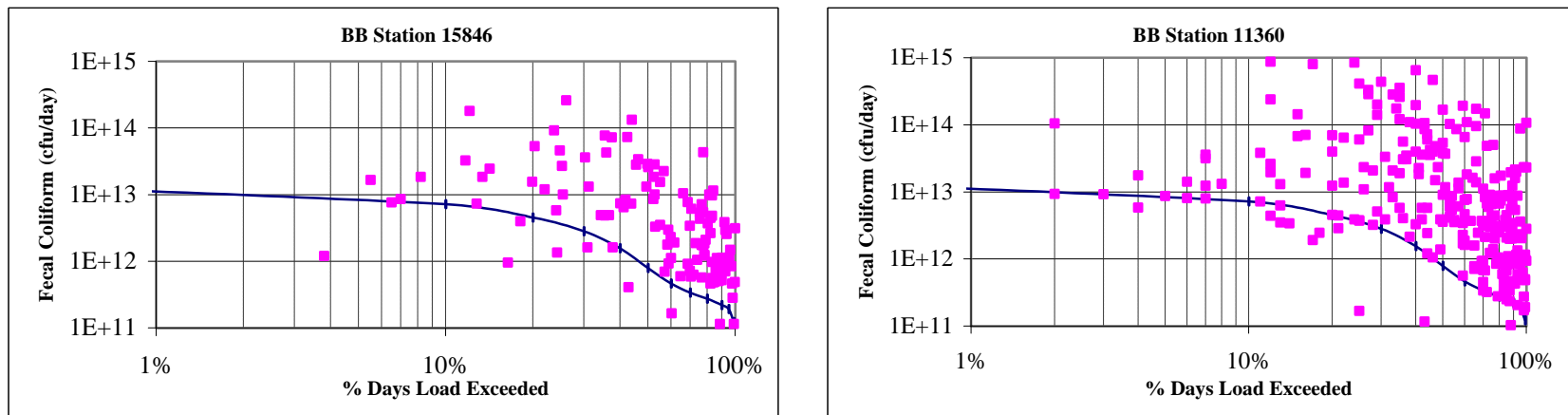


Figure 3.14 TMDL Curves for Buffalo Bayou (Continued)

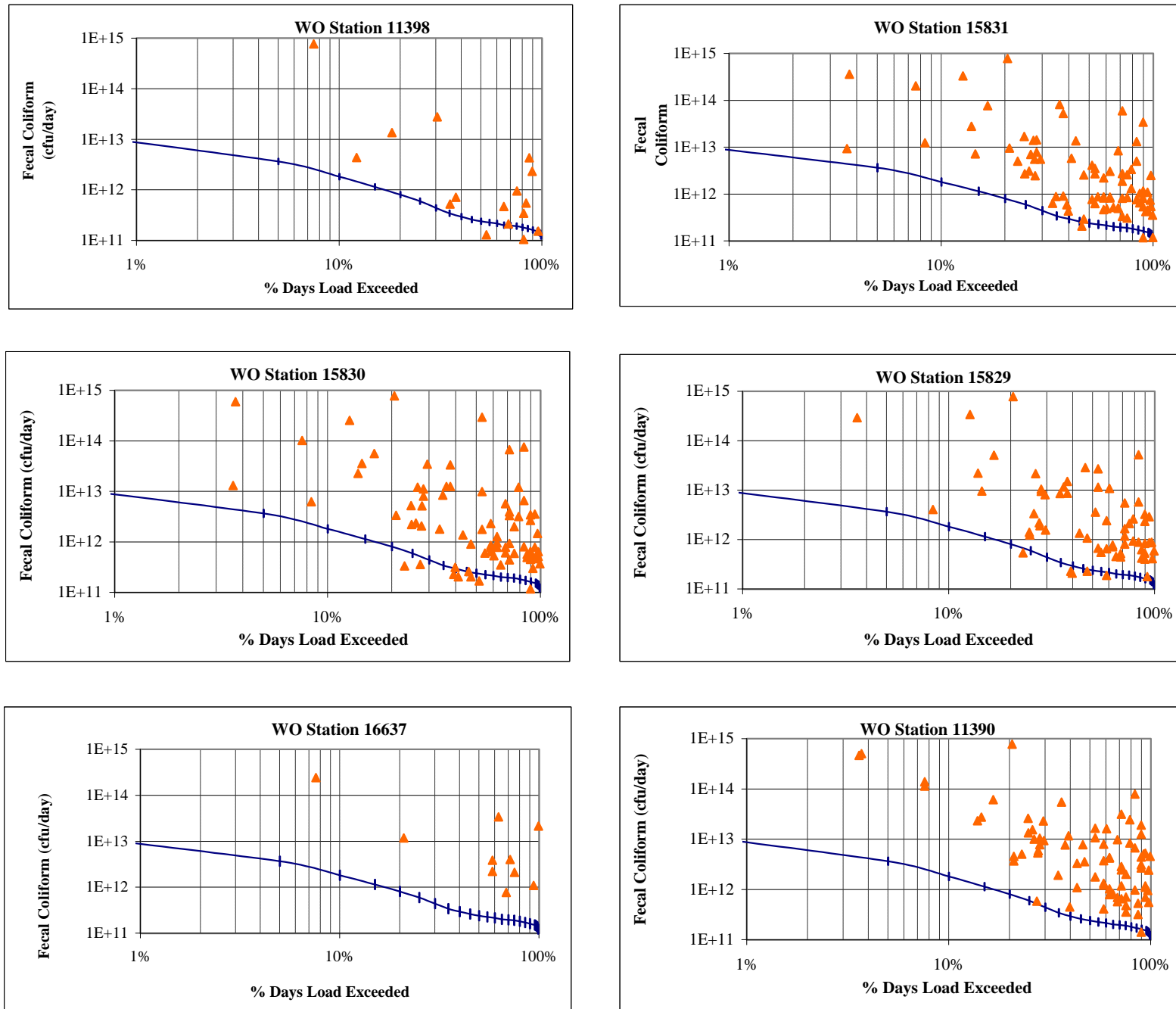


Figure 3.14 TMDL Curves for Whiteoak Bayou Stations

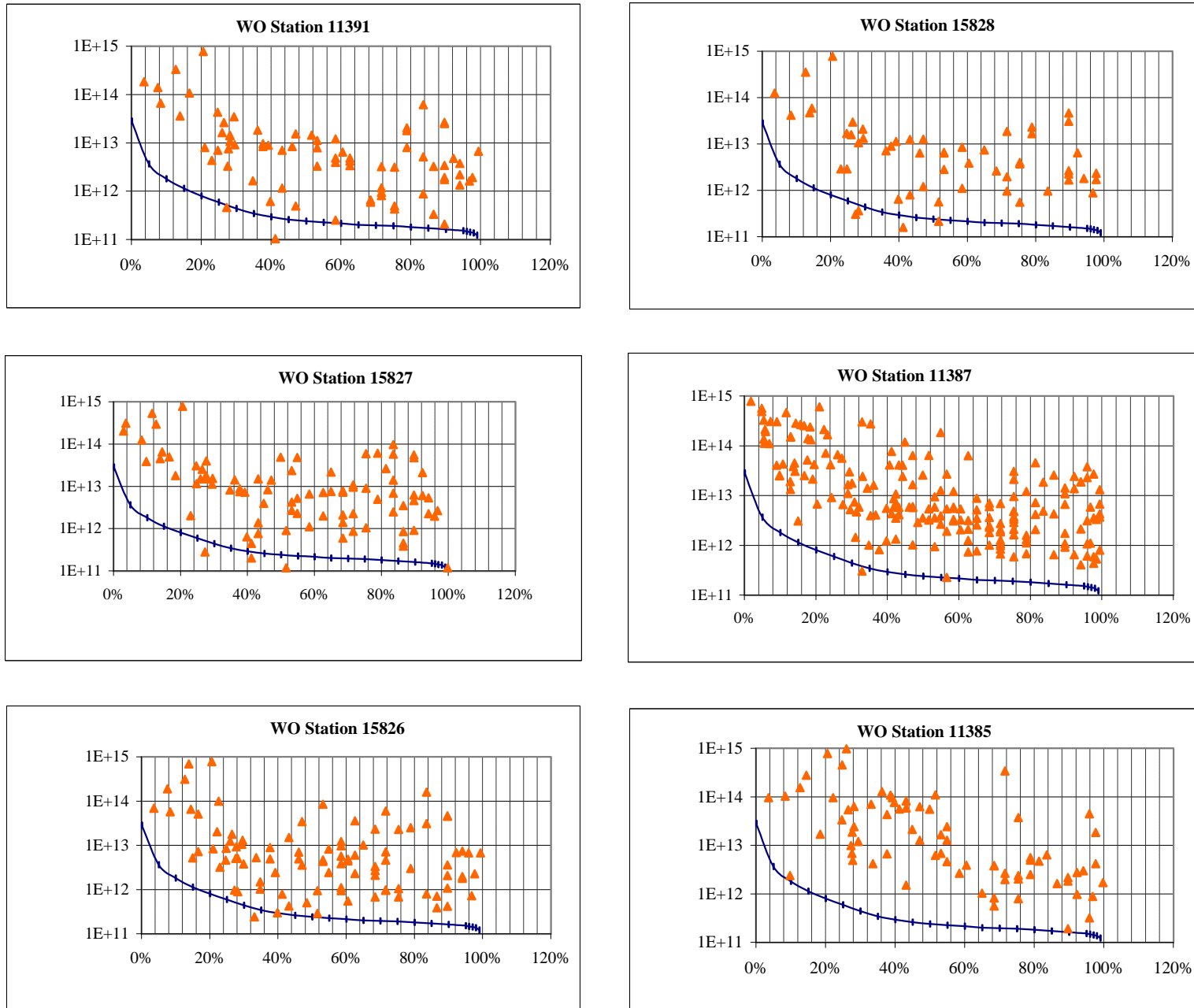


Figure 3.14 TMDL Curves for Whiteoak Bayou Stations (Continued)

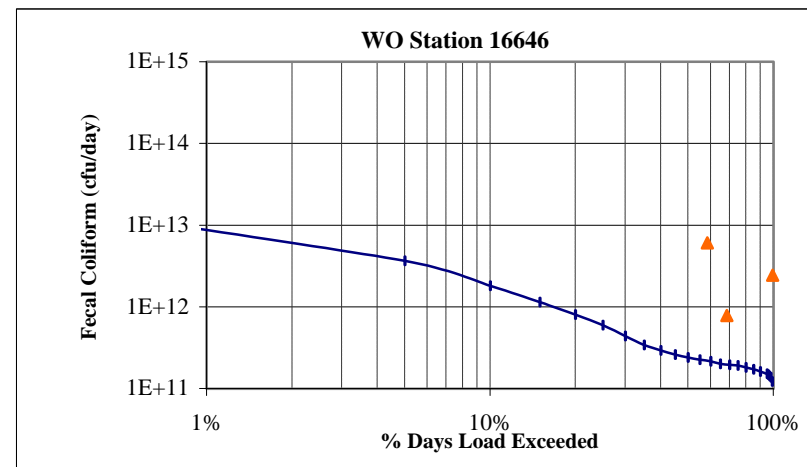
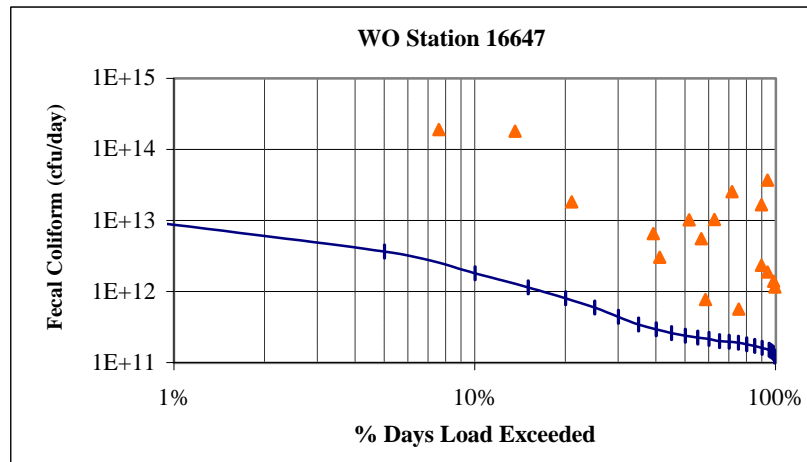
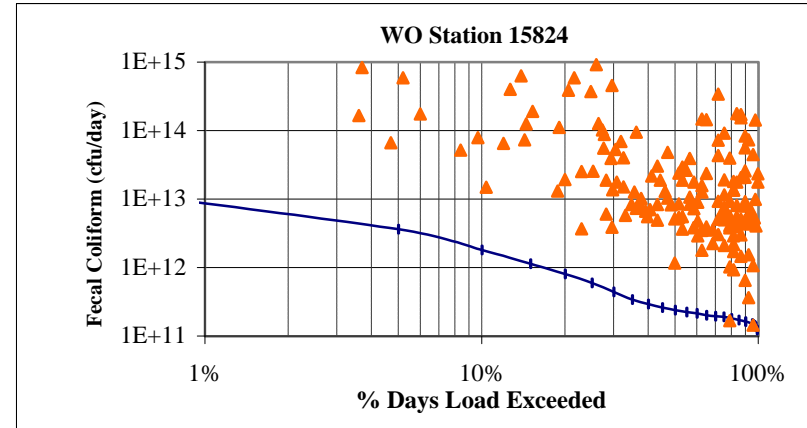
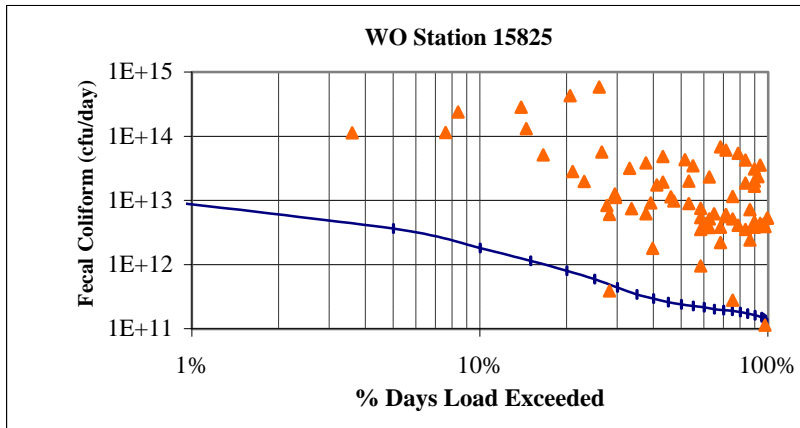


Figure 3.14 TMDL Curves for Whiteoak Bayou Stations (Continued)

3.3.12 Conclusions and Recommendations

While there is a great deal of bacteria monitoring data available to characterize bayou levels, there appears to be very little available to identify specific sources of bacteria. More monitoring efforts targeted to testing specific sources will be needed to achieve the overall TMDL objectives.

Among the types of targeted monitoring that appear to be needed are: point source effluent testing, monitoring for sewer leaks and illicit discharges, special studies to address mechanisms such as regrowth/reactivation, sediment and avian sources, and monitoring of smaller runoff events.

CHAPTER 4

MODELING SOURCES AND MAJOR PROCESSES CONTROLLING OBSERVED LEVELS OF BACTERIA IN BUFFALO AND WHITEOAK BAYOUS

A major component of the Fecal Pathogen TMDL study will be the application of a suitable model to quantify the fate and transport of the indicator bacteria and to determine the maximum permissible loading to Buffalo and Whiteoak Bayous that will meet contact recreation criteria (Task 1.4). The modeling will also have to elucidate the effects of various sources and examine the effects of specific control measures. As part of the first work order for this contract (Work Order No. 582-0-80121-01), an in-depth model review was undertaken to evaluate the suitability of the existing Buffalo and Whiteoak Bayou SWWM models for meeting the goals of the project.

This chapter summarizes the findings from the review and provides justification for selecting the HSPF model for the study, as well as describes the activities needed to complete the modeling task. HSPF model development and calibration will be accomplished using the historical data gathered to date and the additional data that will be collected in this TMDL project. The EPA BASINS GIS interface will be used in this effort to the extent that is practical.

4.1 MODEL REVIEW

As discussed in the Source Analysis section, there are a number of sources of indicator bacteria and several important processes to be considered. The bacteria levels in the bayous are a combined result of inputs from the watersheds as well as processes in the bayous. A number of sources may have significant effects in dry weather conditions. These include point sources, direct sewage inputs from collection system leaks, and seepage or leaks from un-sewered areas. In addition, runoff is also a significant source of bacteria during wet weather periods. Of particular interest are the small to moderate rain events that result in moderate flow conditions under which contact recreation is still practical. Given that runoff from such events would impact the fate and transport of bacteria in the bayous for a period following the events, the modeling must include runoff simulations. Therefore, a dynamic model is required instead of a steady-state model. An additional requirement is the capability of the model to represent data sets collected along the bayou over a short time span following a wide range of antecedent conditions. To achieve this goal efficiently, a continuous model is a practical necessity.

Ward and Benaman (1999) have conducted a survey and review of models for TMDL application in Texas. They concluded that the following are the most appropriate existing models for watershed simulation:

- Hydrologic Simulation Program – Fortran (HSPF) by the U.S. Environmental Protection Agency (EPA).
- Soil and Water Assessment Tool (SWAT) by the Agricultural Research Service of the U.S. Department of Agriculture.
- Precipitation-Runoff Modeling System (PRMS) by the U.S. Geological Survey.

They noted that while these were recommended, each has significant weaknesses and limitations for Texas application. They also identified the EPA Storm Water Management Model (SWMM) as a specialized model that may be applicable for some TMDL problems in urban areas.

Since PRMS does not include a water-quality capability, it is not further considered in this evaluation. Ward and Benaman commented that the greatest weakness of SWAT is its reliance on the empirical formulations of the curve number method and the universal soil loss equation. Between SWAT and HSPF, the deterministic basis of HSPF hydrology and sediment loading is preferred.

For this review, SWMM and HSPF are short-listed for further evaluation for the following reasons. They are readily available in the public domain. They have undergone years of development. They have been used extensively for various purposes and are widely accepted professionally. Various forms of technical support are available such as limited support from the model developers and Internet discussion groups.

SWMM simulates storm events with rainfall input, other meteorological inputs and system characterization to predict runoff quantity and quality. It is capable of modeling the rainfall/runoff process, including surface and subsurface flows, runoff quality, the transport routing through the drainage networks or channel systems, and through a set of storage and treatment units. Either the Horton or the Greens-Ampt equations can be used for estimating infiltration in SWMM. The kinematic wave method is used for flow routing. Alternatively, one of the modules, the EXTRAN block, can perform in-stream flow routing by solving the St. Venant's equations. However, the EXTRAN block does not have water quality simulation capability.

HSPF simulates the hydrologic and water quality processes on pervious and impervious land surfaces as well as streams. It uses a conceptual framework to account for the fluxes and storage involved in interception, infiltration, overland flow, interflow, groundwater and evapotranspiration. The model performs fate and transport of water quality constituents in one-dimensional channels. The kinematic wave method is used to obtain the land segment flows and to perform channel routing.

Both SWMM and HSPF are capable of modeling the following processes that are relevant in the TMDL study:

- Build-up and washoff of water quality constituents in the watershed.
- Quality routing by means of advection and mixing in the stream.
- In-stream first-order decay of water quality constituents.
- Scour and deposition of sediments in the stream.

SWMM was originally developed for event simulation. A continuous simulation capability has been added in a later version. In order to perform continuous simulation, the model needs to account explicitly for antecedent conditions. In the case of the Horton model, SWMM uses a hypothetical drying curve to regenerate infiltration capacity during dry weather. For the Green-Ampt model, recovery of infiltration capacity is by means of a simple empirical procedure. In contrast, HSPF was developed as a continuous model. It computes a continuous moisture balance within a watershed, taking into account evapotranspiration and other long-term hydrologic abstractions that are responsible for the change in moisture during dry periods. It appears that HSPF is the better choice for continuous simulation.

Ward and Benaman (1999) also recommended QUAL-TX for steady-state, low-flow-dominated problems. QUAL-TX is a one-dimensional steady-state water quality model developed by the predecessor agencies to the TNRCC. It is a modified version of the EPA QUAL-II. The model has been widely used in the field of water quality modeling, especially for stream waste load allocation for meeting dissolved oxygen criteria. The model solves the one-dimensional mass transport equation which describes the effects of advection, dispersion, decay, sources and sinks of the constituents being modeled. The hydraulics is handled by solving the continuity equation for flow and then obtaining the depth from stage-discharge relationship. While the representation of sources, sinks and biochemical processes is good, the inability of the QUAL-TX model to simulate runoff or dynamic flow conditions eliminates it from consideration at this point. Nevertheless, if future events in the project show that only steady-state low flow conditions are important, QUAL-TX may be reconsidered.

For time varying problems, Ward and Benaman suggested that the DYNHYD/WASP combination (Dynamic Hydrodynamics Program and Water-quality Analysis Simulation Program by EPA) is the best option available for modeling streams and rivers. However, there is indication that DYNHYD may not be able to handle the abrupt storm events common in Texas. Moreover, a disadvantage of WASP is that it requires user-supplied kinetics.

Ward and Benaman (1999) recommended that the receiving water component of HSPF not be used in TMDL evaluations for two reasons. First, the flow routing in HSPF is very simplistic and depends on a user-defined relation between discharge and depth, in

principle similar to the approach in QUAL-TX. Second, the resolution of the watercourse is limited by the delineation of the subwatershed segments.

The above limitations do not appear to be severe enough to preclude the use of the stream module in HSPF for TMDL application. A recent TMDL application of HSPF for fecal coliform in Idaho appears to have satisfactory results (EPA, 2000). As the model will only be used for conditions where contact recreation is practical (i.e. low to moderate flows), the lack of sophisticated hydraulics does not pose a limitation. Adequate resolution of the bayous could easily be obtained by delineating smaller subwatersheds and reaches in the areas of interest while still keeping the total number of subwatersheds to a manageable level. On the other hand, there does not appear to be a distinctively better alternative to using the HSPF stream module. As noted above, the DYNHYD/WASP combination recommended by Ward and Benaman (1999) has its own limitations. Moreover, linking HSPF to DYNHYD/WASP, or any other receiving water model, will significantly increase the complexity of the modeling effort.

4.2 PRELIMINARY RECOMMENDATIONS

Based on a review of various water quality models by the project team and consideration of the recommendations in Ward and Benaman (1999), HSPF with both its watershed and stream modules appears to be the best option and is recommended for the bacteria TMDL study. The project team has discussed the above model evaluation with Dr. George Ward. He basically concurred with the recommendation (Ward, 2000). Nevertheless, he cautioned that there might be stability problem in the HSPF stream module when the stream is finely divided into small reaches. This particular aspect will

be investigated in the early stage of the modeling effort. In the event that there are indeed problems with the HSPF stream module, depending on the seriousness of the problems, necessary precautionary and/or remedial measures will be developed, or a suitable receiving water model may have to be linked with the watershed module of HSPF.

A list of model requirements as well as the availability of the data to date is included in Table 4.1.

The project team may consider using the HSPF model built in the BASINS platform (i.e. NPSM). The reason for this is that the use of an integrated modeling system will allow the comprehensive management of water resources, while taking advantage of GIS capabilities. The Better Assessment Science Integrating Point and Nonpoint Sources (BASINS) system was developed under the direction of EPA's Office of Science and Technology, Standards and Applied Science Division and in cooperation with an interdisciplinary team from Tetra Tech, Inc. (Lahlou *et al.*, 1998). BASINS is an interface designed within the GIS platform, ArcView 3.x that provides a more efficient way to approach watershed and water quality management. It integrates several environmental data sets with analysis techniques and environmental models, and assists in various stages of environmental management and planning. The user interface is designed to facilitate data input using GIS capabilities. In addition, BASINS was partially designed as a tool to support TMDL development (Lahlou *et al.*, 1998).

Table 4.1
DATA REQUIREMENTS FOR HSPF (NPSM in BASINS)

<u>Data type</u>	<u>Available?</u>
Land use-land cover data	Yes (GBNEP, BASINS)
Estimated number of swine and beef and dairy cows	Needs to be prepared
% annual manure production applied to cropland	Needs to be prepared
Assumed number of wildlife per square mile	Needs to be prepared
Cattle in streams/other point sources	Needs to be prepared
Watershed delineation	Yes (Flood Control, PBS&J)
Stream networks – river reach files	Yes (EPA R1 and R3)
Stream geometry/cross sections (depth, channel lengths and slopes, cross-sectional area, wetted perimeter, flow rate)	Needs to be prepared
Digital elevation data	Yes (TNRIS)
Soils data	Yes (TNRIS)
Weather data	Yes (USGS)
Precipitation data (hourly)	
Temperature (daily max and min, daily dewpoint)	
Wind (total daily wind movement)	
Evapotranspiration (daily pan evapotranspiration)	
Total daily solar radiation	
Average daily cloud cover	
Population/areas served by septic systems	Yes
Point sources	Yes
Estimated/actual concentration in runoff	From TMDL Sampling Plan
Sediment concentrations and mass losses in runoff	From TMDL Sampling Plan
Resuspension from sediment	From TMDL Sampling Plan
Measured concentrations of FC	Yes (TNRCC, USGS, PWE)
Flow	Yes (USGS)
Rates during monitored storm events	
Flow volume (daily, monthly, annual)	

The BASINS system combines six components for performing watershed and water quality analysis:

National databases with local data import tools

Assessment tools (*TARGET*, *ASSESS*, and Data Mining) that address needs ranging from large-scale to small-scale basins

Watershed Characterization Reports

Utilities including Data Import, Land Use Re-Classification, DEM Reclassification, and Watershed Delineation

Watershed and water quality models including NPSM/HSPF, TOXIRoute, and QUAL2E

Post-processing output tools.

The BASINS system includes, in addition to the NPSM model (which is the Windows version of HSPF), two other watercourse models to predict the impact of different point and nonpoint source loading scenarios on surface water bodies. These models are TOXIRoute and QUAL2E. The use of QUAL2E is restricted to steady-state flow conditions, but if future research in the project shows that only steady-state low flow conditions are important, this could be the model of choice (see previous discussion on the QUAL-TX model).

As discussed by Ward and Benaman (1999), the usefulness of BASINS consists largely on the fact that it is a starting point for the modeler. It provides a varied array of data files and it allows the user to perform model runs and calibrations with minimal time spent on data management itself. The postprocessor supports daily, monthly, and annual NPSM output. The postprocessor displays NPSM simulation output, BASINS water quality observation data, and USGS flow data in a graphical format. It also performs basic statistical calculations and data comparison. However, Ward and Benaman (1999) cautioned the fact that this software is too easily accessible to the inexperienced user: it does require certain degree of knowledge and experience in order to use it correctly and make sense of the results. They concluded that while BASINS as a model shell offers some potentially important advantages, in facilitating set-up of a watershed model, and in

allowing preliminary simplified model evaluations, its use could be limited due to bugs in the present model (version 2.1) that will have to be worked through. In addition, better receiving water models could be needed for final TMDL determinations than afforded by BASINS.

As of this writing a new version of BASIN has been released (i.e. version 3.0-beta). This version includes updates related to the year 2000 compliance as well as improvements to existing functions and models. It is likely that this new version corrects some of the bugs reported in the previous one. In addition, case studies reporting the successful use of BASINS for the development of fecal coliform TMDLs in Idaho (EPA, 2000) and Florida (EPA Region 4, 2000) may support the use of this platform in our project.

4.3 MODELING ACTIVITIES

The goal of this task is to use models to elucidate the sources and major processes controlling observed levels of fecal pathogens in Buffalo and Whiteoak Bayous and to identify the maximum permissible loading. The models will also be used to examine the effects of specific control measures. This modeling effort will use fecal coliform and/or the current *Escherichia coli* (*E. coli*) criteria (TNRCC, 2000), as applicable, as the basis of evaluation.

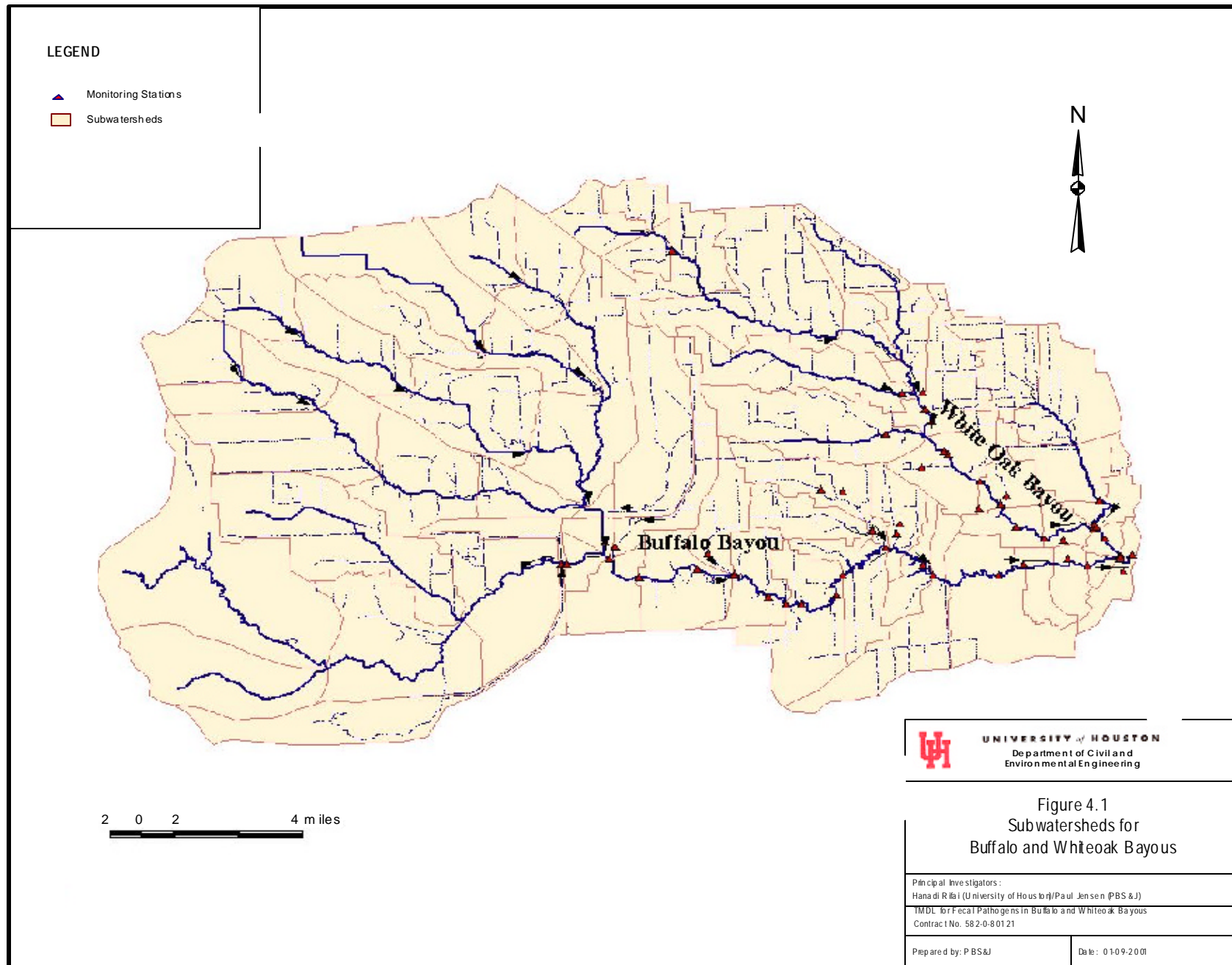
Key steps in the modeling effort include the following:

- *Delineation of the Buffalo and Whiteoak Bayou watersheds to define subwatersheds.*

The intersections of the boundaries of these subwatersheds and the bayous and tributaries then define the reaches in the model. Factors to be considered in the

delineation include locations of stream gages, locations of bacteria monitoring stations, locations of confluences with major tributaries, variation of channel characteristics, and desired spatial resolution for scenario simulations. **Figure 4.1** shows a preliminary delineation of the watersheds. This will be refined as part of the modeling task.

- *Compilation and preparation* of water quality, sources, and other data on fecal pathogens from previous stages of the project and additional data collection conducted as part of the TMDL. This step also includes the preparation of precipitation and meteorological data, watershed land use/land cover characteristics, hydrography and channel characterization, and other data needed to set-up the HSPF model for Buffalo and Whiteoak Bayous (See Table 4.1).
- *Model calibration* to existing conditions using the collected data. Model calibration will be refined through the following steps:
 - develop an overall water mass balance that compares well with observed data by adjusting overall gains and losses of water in the watershed from precipitation, evapotranspiration, and loss to deep groundwater;
 - match the monitoring data by adjusting the rates at which water percolates through the soil, enters groundwater, and recharges streams in a trial-and-error fashion;
 - match peak storm volumes and reproduce the number of days required for flow to return to normal levels;
 - fit the seasonal distribution of flows based on seasonal variation in evapotranspiration, soil moisture, etc.; and



match the observed fecal coliform/*E. coli* concentrations by iteratively adjusting the point and non-point sources on a subwatershed-by-subwatershed basis.

- *Sensitivity analyses* to show the extent of variation or uncertainty in the model to changes in various parameters in the model.
- *Model runs* to predict required bacteria load reduction for the studied bayous to meet the water quality standards, and how long it would take to meet these targets. The model will also be run under specific bacteria discharge reduction scenarios.

CHAPTER 5

MONITORING PLAN FOR ADDITIONAL DATA COLLECTION

The Buffalo and Whiteoak Bayou systems have been and continue to be monitored for a range of conventional water quality parameters. The monitoring data have been analyzed (Chapter 2) and indicate that the bayous maintain relatively high concentrations of indicator bacteria even under dry weather conditions when essentially all of the flow is composed of treated and disinfected wastewater. The expectation for disinfected wastewater would be low bacteria levels.

The main reasons for monitoring under the TMDL project are to understand and document the sources of these elevated bacteria levels so that development of appropriate control measures that can be implemented to bring bacteria levels into compliance with the contact recreation criteria. A second reason is to better understand the processes affecting bacteria concentrations in the bayous, such as survival in the water and sediment, possible regrowth/reactivation, and inputs from the sediments. A third reason for monitoring is to obtain better data to calibrate a water quality model of the system.

A quality assurance project plan (QAPP) for the monitoring activities in support of the bacteria TMDL was developed and is included in Appendix D. Monitoring activities will include four major components:

- Monitoring of point sources,
- Searches for illicit discharges in both sewer and unsewered areas, and
- Moderate runoff event sampling

- Analyses of concentration dynamics in the bayous.

5.1 POINT SOURCE MONITORING

In dry weather essentially all of the flow in these urban bayous is from point source discharges. Therefore, our search for understanding of water bacteria levels will start with these water sources. These discharges are required to maintain a chlorine residual of 1 mg/L for at least 20 minutes and plants larger than 1 MGD are required to dechlorinate down to a concentration of <0.01 mg/L. These requirements must be met in wet weather conditions when the plants are at maximum permitted flows (these requirements must be met at all times, although they are most difficult to meet during wet weather events). In practice, the chlorine contact time is much longer in dry weather and low flows. If all of these requirements were met, in theory there should be very low levels of indicator bacteria in the effluents. Since the effluents essentially are the bayou flows in dry weather, low bacteria levels should be the norm. However, sampling done as part of a recent Greens Bayou Intensive Survey (City of Houston Public Works and Engineering Department, 1999) showed discharged FC concentrations higher than 200 cfu/dL, with 2 of 12 samples exhibiting FC counts near 10,000 cfu/dL. Similarly, data from inspections conducted by HCPC between 1998 and 2000 showed that 25 out of 29 measurements (for a total of 18 small plants in the Buffalo and Whiteoak Bayous) exceeded the limit of 200 cfu/dL, with 14 samples showing FC levels higher than 10,000 cfu/dL.

One of the problems with smaller plants may be poor control over the chlorination process. While the City of Houston (COH) plants in these stream segments have a sophisticated system to regulate the dosage of disinfectant and the sodium bisulfite dechlorination agent, that is not true for many of the smaller facilities. That lack of

automatic control, plus the fact that these plants are checked infrequently, may mean that high levels of indicator bacteria are not at all uncommon. In Whiteoak and Buffalo, there are 76 and 44 domestic WWTP with flows lower than 1 MGD, respectively releasing close to 38 and 12% of the median flow in these bayous (45 and 90 cfs, respectively).

To investigate and document this situation a program of point source monitoring that will include early morning and mid-morning sampling of a broad range of plants over the course of a 6-month period is proposed. This sampling effort will cover all the minor domestic wastewater treatment plants (flow less than 1 MGD) discharging to Buffalo and Whiteoak Bayous. A total of 120 wastewater dischargers will be sampled (see Figure 5.1 and Table 5.1 for sampling location and scheduling)

A sampling crew (2 people) will leave early in the morning to sample two small plants by 0800, and then will deliver the samples to the lab. This round of samples will characterize the discharge at the low point in the diurnal flow cycle. Samples will be collected at a point following the chlorine contact chamber as it is flowing over the weir. The sampling will include doing a field measurement of residual chlorine, estimating the flow, estimating conventional chemical parameters (see Table 5.2) and collecting water samples for laboratory analyses. Each of the samples will be analyzed for FC and *E. coli* along with TSS

The *E. coli* analyses will be performed using the IDEXX Colilert method that is a separate test from the FC analysis, which may result in *E. coli* counts higher than the FC data.

To sample the high flow period, the crew will repeat the trip in mid-morning, getting the samples to the lab by early afternoon. This process will continue during dry

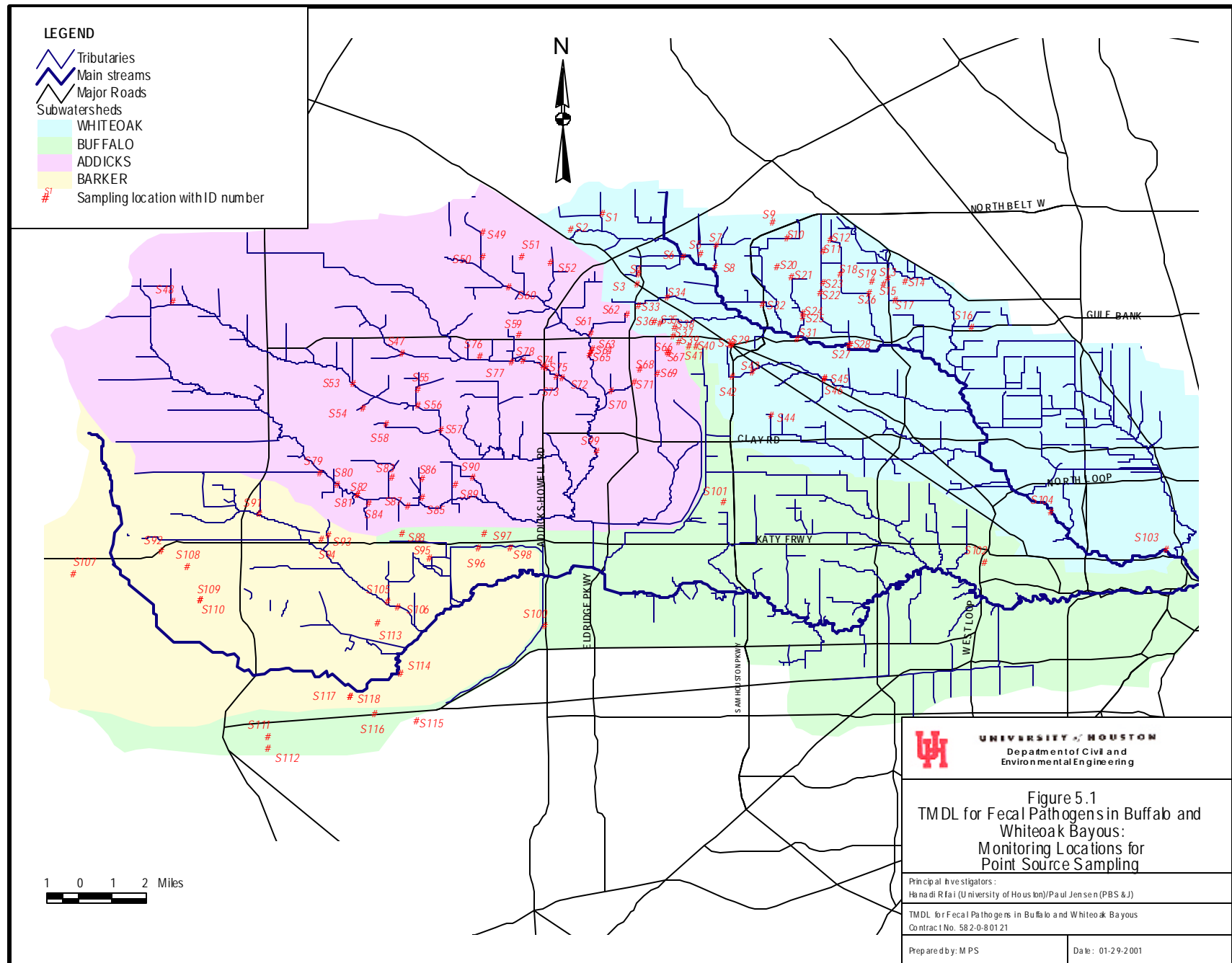


Table 5.1 Monitoring Sites and Frequencies

Sampling Component ^a	Segment	Site description	Permit number/ Station ID	Sample ID	Start Date	End Date	SCI/	Prog	Monitoring frequencies (per monitoring program)									Grain size
							SC2	Code	Flow	FC	EC	TSS	TOC	Wet chemistry ^b	Residual chlorine	Ammonia	CBOD ₅	
I.1	1017	HARRIS CO FWSD 061	10876-001	S1	7/2/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	TIFCO INDUSTRIES	12465-001	S2	7/2/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	DANIEL INDUSTRIES	12397-001	S3	7/3/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	NORTHW HARRIS CO MUD 029	12795-001	S4	7/3/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	WHITE OAK BEND MUD	11979-002	S5	7/4/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	HARRIS CO MUD 170	12121-001	S6	7/4/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	REID ROAD MUD 001	11563-001	S7	7/5/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	WEST HARRIS CO MUD 010	14072-001	S8	7/5/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	AQUASOURCE DEVELOPMENT	13433-001	S9	7/9/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	WEST HARRIS CO MUD	13623-001	S10	7/9/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	SUPERIOR DERRICK SERV	12443-001	S11	7/10/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	RIEDEL, ANTHONY	13939-001	S12	7/10/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	ABB VETCO GRAY INC	11651-001	S13	7/11/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	SMITH, WILLIAM	12573-001	S14	7/11/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	HANOVER LAND CO.	11797-001	S15	7/12/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	CHAMPS WATER CO.	11005-001	S16	7/12/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	HARRIS CO MUD #119	12714-001	S17	7/16/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	CBI NA-CON INC.	11389-001	S18	7/16/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	KONECRANES LANDEL	13912-001	S19	7/17/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	C&P UTILITIES	12342-001	S20	7/17/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	SMITH, BOB	13509-001	S21	7/18/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	HARRIS CO METRO UD	13673-001	S22	7/18/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	MOORPARK VILLAGE	13727-001	S23	7/19/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	ROLLING FORK PUD	11188-001	S24	7/19/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	CREEKSIDE UTILITIES	11375-001	S25	7/23/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	HARRIS CO MUD 006	11273-001	S26	7/23/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	HARRIS CO MUD 023	11485-001	S27	7/24/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	SUNBELT FWSD	11670-001	S28	7/24/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	MCDONALDS CORP.	13807-001	S29	7/25/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	RESTAURANT SERVICE	13983-001	S30	7/25/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	VANCOUVER MANAGEMENT	11051-001	S31	7/26/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	WEST HARRIS CO MUD 011	13689-001	S32	7/26/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	HARRIS CO MUD 130	12574-001	S33	7/30/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	HARRIS CO MUD 247	12681-001	S34	7/30/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	NCI BUILDING SYSTEMS	12552-001	S35	7/31/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	NCI BUILDING SYSTEMS	12552-002	S36	7/31/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	ADAMOLI, JAMES	12811-001	S37	8/1/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	COOPER CAMERON CORP.	13578-001	S38	8/1/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	OCEANEERING	12466-001	S39	8/2/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	ROBINSON, J. WAYNE	12830-001	S40	8/2/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	WEATHERFORD U.S.	14070-001	S41	8/6/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	AQUASOURCE UTILITY	11193-001	S42	8/6/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	AQUASOURCE UTILITY	12222-001	S43	8/7/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	HOUSTON-WESTWAY UD	10495-139	S44	8/7/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	FAIRBANKS PLAZA SHOPPING	12139-001	S45	8/8/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	TRAMMELL CROW	13996-001	S46	8/8/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HARRIS CO MUD 157	11906-001	S47	8/9/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			

Table 5.1 Monitoring Sites and Frequencies

Sampling Component ^a	Segment	Site description	Permit number/ Station ID	Sample ID	Start Date	End Date	SCI/	Prog	Monitoring frequencies (per monitoring program)									
							SC2	Code	Flow	FC	EC	TSS	TOC	Wet chemistry ^b	Residual chlorine	Ammonia	CBOD ₅	Grain size
	1014	HARRIS CO.-JUVENILE BOOT CAMP	13921-001	S48	8/9/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HARRIS CO MUD 196	12447-001	S49	8/13/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	REMINGTON MUD 001	13328-001	S50	8/13/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	WYMAN-GORDON FORGINGS	01402-002	S51	8/14/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	WEST HARRIS CO MUD #15	12223-001	S52	8/14/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HARRIS CO MUD 105	11792-002	S53	8/15/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	NORTHW HARRIS CO MUD 012	11991-001	S54	8/15/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HARRIS CO MUD 127	12209-001	S55	8/16/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HARRIS CO MUD 167	12834-001	S56	8/16/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	ROLLING CREEK UD	12841-001	S57	8/20/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HARRIS CO MUD 284	12949-001	S58	8/20/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HARRIS CO MUD #149	11836-001	S59	8/21/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HARRIS CO MUD 155	12726-001	S60	8/21/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	SPENCER ROAD PUD	11472-001	S61	8/22/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	CHIMNEY HILL MUD	12304-001	S62	8/22/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	SASSON, ELI	11414-001	S63	8/23/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	VERRY, RICHARD	12310-001	S64	8/23/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HARRIS CO MUD 250	12685-001	S65	8/27/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	PETERSEN, JAMES	12398-001	S66	8/27/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	529 #35, LTD	13484-001	S67	8/28/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	VARCO SHAFFER	03994-001	S68	8/28/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	AIR LIQUIDE AMERICA	13959-001	S69	8/29/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HORSEPEN BAYOU MUD	12128-001	S70	8/29/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	TOSHIBA INTERNATIONAL	03153-002	S71	8/30/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HARRIS CO MUD 102	11523-001	S72	8/30/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HARRIS CO MUD 185	12124-001	S73	9/3/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HARRIS CO MUD 276	12927-001	S74	9/3/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	FRIEDMAN, STEPHEN	13778-001	S75	9/4/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	LANGHAM CREEK UD	11682-001	S76	9/4/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	NORTHWEST HARRIS CO MUD 16	11935-001	S77	9/5/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HARRIS CO MUD 166,257,276	12474-001	S78	9/5/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HARRIS CO MUD 071	11917-001	S79	9/6/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	WEST HARRIS CO MUD 007	12140-001	S80	9/6/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	TEX-SUN PARKS	12189-001	S81	9/10/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	WEST HARRIS CO MUD 017	12247-001	S82	9/10/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	MAYDE CREEK MUD	11969-001	S83	9/11/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	FRY ROAD MUD	11989-001	S84	9/11/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	KATY ISD	12110-001	S85	9/12/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HARRIS CO MUD 238	12802-001	S86	9/12/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	WESTLAKE MUD 001	11284-001	S87	9/13/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	WEST PARK MUD	12346-001	S88	9/13/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	ADDICKS UD	11696-002	S89	9/17/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	WEST HOUSTON AIRPORT	12516-001	S90	9/17/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	WILLIAMSBURG REGIONAL	11598-001	S91	9/18/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	WESTON MUD	12412-001	S92	9/18/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HARRIS COUNTY-BEAR CK	11883-001	S93	9/19/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	TRANSWESTERN KATY FREEWAY	11632-001	S94	9/19/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			

Table 5.1 Monitoring Sites and Frequencies

Sampling Component ^a	Segment	Site description	Permit number/ Station ID	Sample ID	Start Date	End Date	SCI/	Prog	Monitoring frequencies (per monitoring program)									
							SC2	Code	Flow	FC	EC	TSS	TOC	Wet chemistry ^b	Residual chlorine	Ammonia	CBOD ₅	Grain size
	1014	CASTLEWOOD MUD	12356-001	S95	9/20/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HARRIS CO. MUD #345	12682-001	S96	9/20/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HOUSTON-PARK TEN	10495-135	S97	9/24/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HARRIS CO MUD 216	12406-001	S98	9/24/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	GREEN TRAILS MUD	10932-001	S99	9/25/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	NOTTINGHAM COUNTRY MUD	12427-001	S100	9/25/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HARRIS COUNTY-CULLEN	12355-001	S101	9/26/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	NOTTINGHAM COUNTRY MUD (WTP)	12233-001	S102	9/26/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	ASEP AMERICA, INC.	12132-001	S103	9/27/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	AIVAZIAN, GEORGE	13764-001	S104	9/27/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	BAYOU CLUB OF HOUSTON	12289-001	S105	10/1/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	TOWER MANAGEMENT SERV	12479-001	S106	10/1/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1017	WHITE OAK OWNERS ASSOC.	12370-001	S107	10/2/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	FORT BEND CO MUD 034	12498-001	S108	10/2/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	FORT BEND CO MUD 037	13775-001	S109	10/3/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	COOPER CAMERON CORP	12805-001	S110	10/3/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HARRIS-FORT BEND COS MUD	13228-001	S111	10/4/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HARRIS-FT BEND CO MUD	12298-001	S112	10/4/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	BIG OAKS MUD	13674-001	S113	10/8/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	CINCO MUD 001	12858-001	S114	10/8/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	RLG REALTY HOLDINGS	13021-001	S115	10/9/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	FT BEND CO MUD 050	13245-001	S116	10/9/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	GRAND LAKES MUD #4	13172-002	S117	10/10/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	CINCO MUD 001	13558-001	S118	10/10/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	HOUSTON AREA DEVELOPMENT	14011-001	S119	10/11/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
	1014	GINTER REAL ESTATE	13218-001	S120	10/11/01		UH/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.2		20 POINT SOURCES (HIGHEST LEVELS)	tbd		10/15/01	11/2/01	UH/UH	DL	2	2	2	2		2	2			
II	1017	PILOT AREA 1 - WHITEOAK	30 locations tbd	I1 to I30	9/3/01	2/1/02	UH/UH	DL	1 dry	1 dry	1 dry	1 dry		1 dry	1 dry	1 dry		
	1014	PILOT AREA 2 - BUFFALO	30 locations tbd	I31 to I60	9/3/01	2/1/02	UH/UH	DL	1 dry	1 dry	1 dry	1 dry		1 dry	1 dry	1 dry		
III	1014	DAIRY ASHFORD RD.	11362	R1	7/2/01	8/31/01	PB/PB	DL	10 wet	10 wet	10 wet	10 wet		10 wet	10 wet			
	1014	WEST BELT	11360	R2	7/2/01	8/31/01	PB/PB	DL		10 wet		10 wet		10 wet	10 wet			
	1014	WEST BELT	11360	R2	7/2/01	8/31/01	GS/GS	DL	10 wet									
	1014	PINEY POINT RD	11358	R3	7/2/01	8/31/01	PB/PB	DL		10 wet	10 wet	10 wet		10 wet				
	1014	PINEY POINT RD	11358	R3	7/2/01	8/31/01	GS/GS	DL	10 wet									
	1014	SHEPHERD DR.	11351	R4	7/2/01	8/31/01	PB/PB	DL	10 wet	10 wet	10 wet	10 wet		10 wet				
	1017	HEIGHTS BLVD.	11387	R5	7/2/01	8/31/01	PB/PB	DL		10 wet	10 wet	10 wet		10 wet				
	1017	HEIGHTS BLVD.	11387	R5	7/2/01	8/31/01	GS/GS	DL	10 wet									
	1017	JONES RD.	11398	R6	7/2/01	8/31/01	PB/PB	DL	10 wet	10 wet	10 wet	10 wet		10 wet				
	1017	W. TIDWELL AVE.	15831	R7	7/2/01	8/31/01	PB/PB	DL	10 wet	10 wet		10 wet		10 wet				
IV.1	1014	SAN FELIPE ST.	11357	D1	8/6/01	12/21/01	PB/PB	DL			5 dry			5 dry				
	1014	WEST BELT	11360	D2	8/6/01	12/21/01	PB/PB	DL			5 dry			5 dry				
	1017	JONES RD.	11398	D3	8/6/01	12/21/01	PB/PB	DL			5 dry			5 dry				
	1017	WATONGA	15830	D4	8/6/01	12/21/01	PB/PB	DL			5 dry			5 dry				
IV.2	1017	HARRIS COUNTY MUD 170	12121-001	RG1	8/6/01	12/21/01	PB/PB	DL	3 dry		3 dry	1 dry	1 dry		3 dry		1 dry	
	1014	HOUSTON-NORTHWEST WWTP	10495-076	RG2	8/6/01	12/21/01	PB/PB	DL	3 dry		3 dry	1 dry	1 dry		3 dry		1 dry	
	1017	MEMORIAL VILLAGES WA	10584-001	RG3	8/6/01	12/21/01	PB/PB	DL	3 dry		3 dry	1 dry	1 dry		3 dry		1 dry	
	1014	HOUSTON-WEST DISTRICT WWTP	10495-030	RG4	8/6/01	12/21/01	PB/PB	DL	3 dry		3 dry	1 dry	1 dry		3 dry		1 dry	
IV.3	1014	SAN FELIPE ST.	11357	RS1	8/6/01	12/21/01	PB/PB	DL			1 dry ^d			1 dry				
	1014	WEST BELT	11360	RS2	8/6/01	12/21/01	PB/PB	DL			1 dry ^d			1 dry				
	1017	JONES RD.	11398	RS3	8/6/01	12/21/01	PB/PB	DL			1 dry ^d			1 dry				
	1017	WATONGA	15830	RS4	8/6/01	12/21/01	PB/PB	DL			1 dry ^d			1 dry				

Table 5.1 Monitoring Sites and Frequencies

Sampling Component ^a	Segment	Site description	Permit number/ Station ID	Sample ID	Start Date	End Date	SCI/	Prog	Monitoring frequencies (per monitoring program)									
							SC2	Code	Flow	FC	EC	TSS	TOC	Wet chemistry ^b	Residual chlorine	Ammonia	CBOD ₅	Grain size
IV.4	1014	BARKER DAM	11142	SE1	9/3/01	12/21/01	UH/UH	DL			1 dry							1 dry
	1014	ELDRIDGE RD.	11363	SE2	9/3/01	12/21/01	UH/UH	DL			1 dry							1 dry
	1014	DAIRY ASHFORD RD.	11362	SE3	9/3/01	12/21/01	UH/UH	DL			1 dry							1 dry
	1014	WILCREST DR.	11361	SE4	9/3/01	12/21/01	UH/UH	DL			1 dry							1 dry
	1014	WEST BELT	11360	SE5	9/3/01	12/21/01	UH/UH	DL			1 dry							1 dry
	1014	BRIAR FOREST AVE.	15846	SE6	9/3/01	12/21/01	UH/UH	DL			1 dry							1 dry
	1014	PINEY POINT RD.	11358	SE7	9/3/01	12/21/01	UH/UH	DL			1 dry							1 dry
	1014	SAN FELIPE ST.	11357	SE8	9/3/01	12/21/01	UH/UH	DL			1 dry							1 dry
	1014	SHEPHERD DR.	11351	SE9	9/3/01	12/21/01	UH/UH	DL			1 dry							1 dry
	1014	VOSS RD.	11356	SE10	9/3/01	12/21/01	UH/UH	DL			1 dry							1 dry
	1014	SAN JACINTO AVE.	15842	SE11	9/3/01	12/21/01	UH/UH	DL			1 dry							1 dry
	1017	JONES RD.	11398	SE12	9/3/01	12/21/01	UH/UH	DL			1 dry							1 dry
	1017	WATONGA	15830	SE13	9/3/01	12/21/01	UH/UH	DL			1 dry							1 dry
	1017	ELLA BLVD.	11391	SE14	9/3/01	12/21/01	UH/UH	DL			1 dry							1 dry
	1017	W. T C JESTER AVE.	15828	SE15	9/3/01	12/21/01	UH/UH	DL			1 dry							1 dry
	1017	W. 43RD ST.	15829	SE16	9/3/01	12/21/01	UH/UH	DL			1 dry							1 dry
	1017	HEIGHTS BLVD.	11387	SE17	9/3/01	12/21/01	UH/UH	DL			1 dry							1 dry
	1017	W.TIDWELL AVE.	15831	SE18	9/3/01	12/21/01	UH/UH	DL			1 dry							1 dry
	tbd	tbd		SE19	9/3/01	12/21/01	UH/UH	DL			1 dry							1 dry
	tbd	tbd		SE20	9/3/01	12/21/01	UH/UH	DL			1 dry							1 dry

^a Monitoring components: I-Point Sources (1. First round, 2. Second round), II-Illegal Discharges, III-Runoff, IV-Dynamics (1. In-stream Dynamics, 2. Growth, 3. Resuspension, 4. Sediment baseline concentration)

^b Wet chemistry analyses include DO, pH, turbidity, conductivity, and PO₄⁻P

^c Two samples taken during the same day (one in the morning and the other at midday) for the first sampling round. If levels are high, then it may be monitored a second time

^d Sediment sample

Source codes need to be obtained prior to submission of data.

Table 5.2 Data Quality Objectives for Measurement Data

PARAMETER	UNITS	METHOD TYPE	METHOD	METHOD DESCRIPTION	STORET	MAL	PRECISION of laboratory duplicates (RPD)	ACCURACY of matrix spikes % Recovery	ACCURACY CRM	PERCENT COMPLETE
Field Parameters										
pH	pH units		EPA 150. land TNRCC SOP		00400	1.0	10	NA	NA	90
DO	mg/L		EPA 360. land TNRCC SOP		00300	1.0	10	NA	NA	90
Conductivity	mS/cm		EPA 120. land TNRCC SOP		00094	1	10	NA	NA	90
Temperature	° Celcius		EPA 170. land TNRCC SOP		00010	NA	10	NA	NA	90
Flow	cfs		TNRCC SOP		00061	NA	10	NA	NA	90
Flow Severity	1-no flow, 2-low, 3-normal, 4-flood, 5-high, 6-dry	TNRCC SOP	TNRCC SOP ²		01351	NA	NA	NA	NA	90
Conventional parameters										
TSS	mg/L	gravimetric	EPA 160.2		00530	4.0	20	NA	NA	90
TOC	mg/L	oxidation	EPA 415.2		00680	0.1	20	80-120	NA	90
Residual chlorine	mg/L	DPD colorimetric	Std. Methods 400-Cl G/ HACH Method 8021		50060	0.01	20	80-120		90
Ammonia-N	mg/L	Colorimetric, salicylate	HACH Methods 10023(low range) and 10031 (high range)			0.02	20	80-120		90
o-Phosphorous	mg/L	colorimetric, absorbic acid	EPA 365.3/ HACH Method 8048		00671	0.01	20	80-120		90
Turbidity	NTU	nephelometric	EPA 180.1		82079		20	NA		90

PARAMETER	UNITS	METHOD TYPE	METHOD	METHOD DESCRIPTION	STORET	MAL	PRECISION of laboratory duplicates (RPD)	ACCURACY of matrix spikes % Recovery	ACCURACY CRM	PERCENT COMPLETE
Carbonaceous Biochemical Oxygen Demand	mg/L	potentiometric	Std. Methods 5210-B		80082		25	NA		90
FC in water	cfu/100 mL	membrane filter, mFC	Std. Methods 9222-D	membrane filter, mFC	31616	1	3.27* R _{log} /h	NA		90
EC in water	MPN/100 mL	Alternate Direct	IDEXX Colilert	IDEXX MPN Quantitray 2000	31699	1	3.27* R _{log} /h	NA		90
EC in sediment ³	cfu/100 g	Resuspension in water with subsequent mTEC		membrane filter, mTEC	31702	1	3.27* R _{log} /h	NA		90
Sediment grain size analysis	% dry weight 0.0039-0.0625 mm	TNRCC SOP	Fract.separation /gravimetric determination		82008	NA	NA	NA		90
Sediment grain size analysis	% dry weight < 0.0039 mm	TNRCC SOP	Fract.separation /gravimetric determination		82009	NA	NA	NA		90
Sediment grain size analysis	% dry weight 0.0625- 2 mm	TNRCC SOP	Fract.separation /gravimetric determination		89991	NA	NA	NA		90

¹ Due to the dependence of rainfall occurrence at certain times, runoff samples will have a lesser percent of completeness

² TNRCC. 1999. Surface Water Quality Monitoring Procedures, pp. 2.16-2.17

³ Bacteria will be transferred from the sediment sample to an aqueous phase and subsequently analyzed using membrane filtration.

weather until all the plants had been sampled and those plants that showed high bacteria values had been resampled (the highest 20).

5.2 ILLICIT DISCHARGES

This component will include sampling of stormsewers discharging into the bayous under dry-weather conditions to identify illicit discharges to the bayous via stormsewers that may come from a sanitary sewer problem of some type or outright unpermitted wastewater discharges. This work will include review of monitoring in the bayous to identify locations where a sudden increase in indicator bacteria occurs, and checking on stormsewers to find flow. In dry weather the stormsewers should be dry so flow could be an illicit discharge.

In general terms, this effort will be undertaken by two-person teams that will work in dry weather only. They will be equipped with maps of the stormsewer system and the locations of the outfalls. Prior to sampling the teams will walk along the bayous and main tributaries to perform reconnaissance of the stormsewer infrastructure. During this reconnaissance effort, the teams will identify how many outfalls are discharging into the bayous and confirm their presence in the GIMS database so that their properties can be determined (diameter, length, material, and age). If an outfall is not found in the GIMS maps, it will be noted with its diameter and material. Geographic locations will be verified using Global Positioning System (GPS) to the extent possible and practical. GPS activities will be conducted using a Motorola LGT 1000 equipped with Starlink MRB-2A radio beacon receiver to correct for selective availability. This equipment has a real time correction providing accuracy of 5 meters.

Once all the outfalls have been located and identified, the sampling activities will start. The sampling points will be based on locatable outfalls discharging under dry-weather conditions. A maximum of 60 points will be sampled for this component. For sampling in the Buffalo Bayou, a canoe will be used to both expand the sampling area and insure detailed coverage. It is expected that in a seven-day period, the area from Eldridge Parkway Bridge to Shepherd Street Bridge could be covered and with a canoe to transport sampling equipment and personnel, 98% of all the outfalls could be located and sampled. Further, for sampling of the remaining segments of Buffalo Bayou as well as sampling of Whiteoak Bayous and the tributaries to both bayous, the crews will walk pilot areas determined after field reconnaissance. The criteria to select those areas include diameter of the stormsewers (sampling will focus mainly on large diameter lines since they represent large drainage areas and this should offer the most coverage for potential dry weather flow) and age of the lines.

The sampling crew will first determine if there is flow, and then determine if there is a residual chlorine level indicating a drinking water leak of some type. If it is chlorinated water, no further work will be done other than the flow estimate. If the flow is significant it should be reported as a water leak. If the water is not chlorinated, two different criteria will be applied to determine whether samples will be collected for bacterial and TSS analyses. First, the presence of ammonia using a field test kit will be assumed as an indicator of fecal contamination and, therefore, samples will be collected. Second, the observation of *Sphaerotilus* will be considered a trigger for sample collection. *Sphaerotilus* is a non-fungus aerobic bacteria that prefers habitats with slowly running fresh water contaminated with sewage and grows attached to submerged plants,

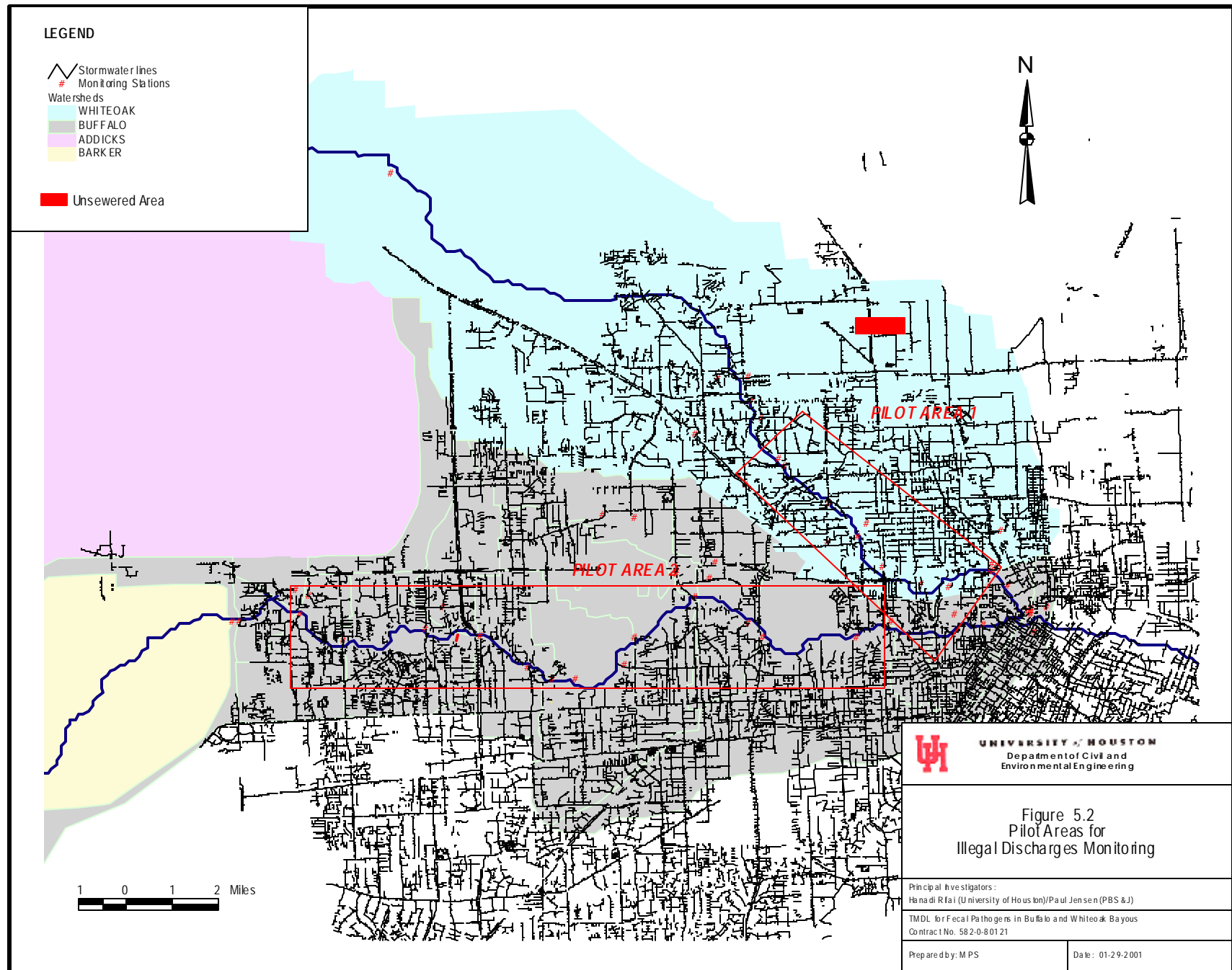
rods, and other solid objects. *Sphaerotilus* will appear submerged in the flow and attached to a hard surface. The color of the growth is a gray to white hue (see Standard Methods for additional information). The sampling crew will also measure the approximate dimensions of the flow and estimate the velocity. The samples will be iced and the team will move to the next stormsewer outfall. By 1400 the team will head to the University of Houston lab arriving in time for the bacteria samples to begin filtration.

Based on available data, two preliminary pilot areas have been identified (Figure 5.2); however, these sampling areas may change as the field reconnaissance is conducted. Table 5.1 includes the sampling schedule for the illicit discharges monitoring.

5.3 RUNOFF EVENT MONITORING

Concentrations of indicator bacteria in runoff tend to be very large, several orders of magnitude greater than the criteria developed for swimming areas in fair weather. For safety as well as bacteria reasons, the main project emphasis needs to be on lower flow conditions. However, there is also a need to consider some runoff events simply because they are often small enough to have a very small effect on flow in the main stem of the bayous, and thus become part of the “background” levels. Accordingly, this monitoring program will include at least three smaller rain events in each watershed.

Runoff event monitoring will be conducted at the USGS locations on each bayou (e.g. Whiteoak Bayou at Heights and Buffalo at West Belt or Piney Point) so that flow data will be available for acquisition. USGS Station 08074200 (Whiteoak at Alabonson) appears to be defective because its record shows a consistent base flow of about 400 cfs; therefore, this station is discarded for runoff sampling. Nor will Buffalo at McKee

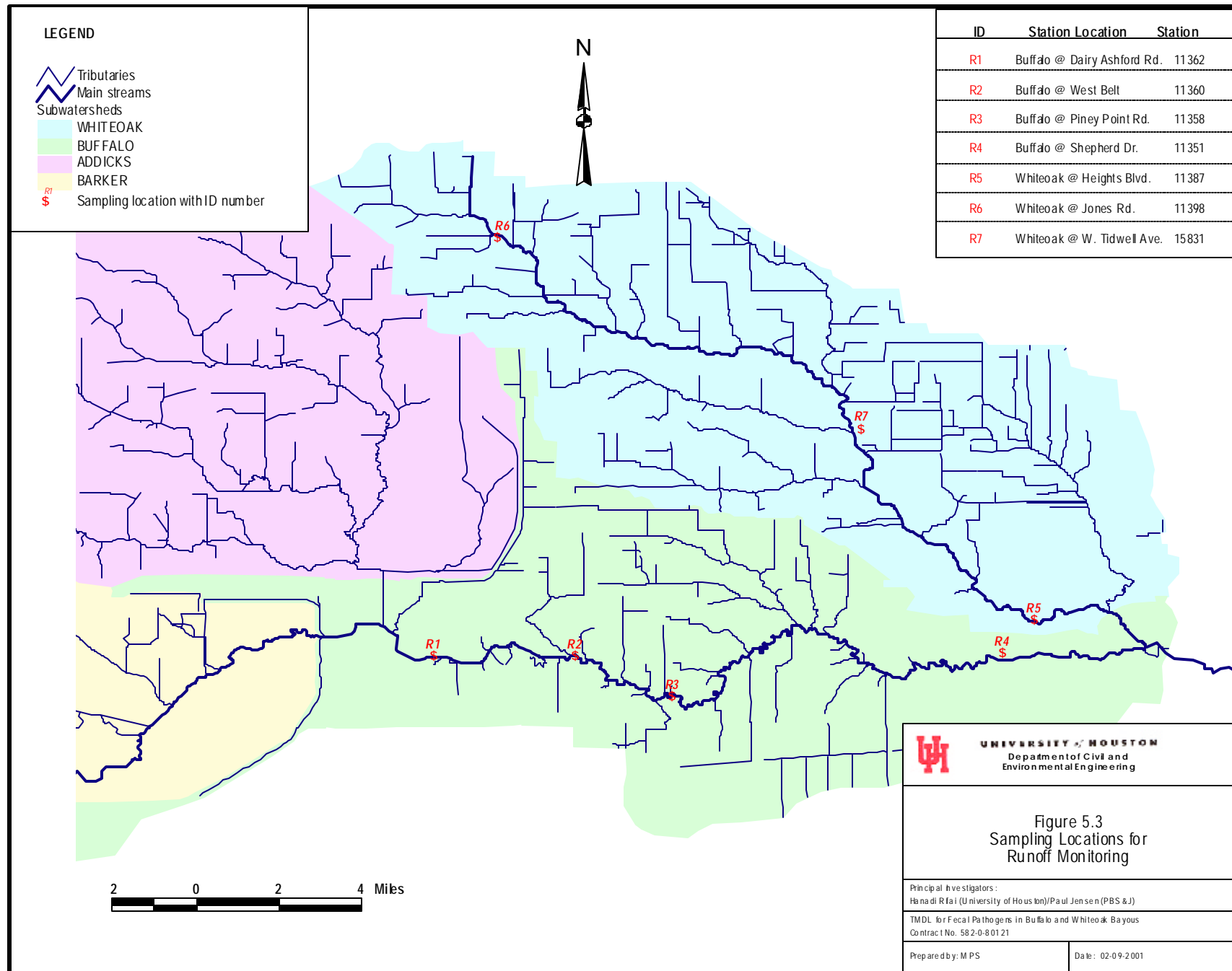


(08074610) and Whiteoak at Main (08074598) be sampled as they are stage record gages and flow is not monitored. The sampling crews will deploy to the USGS gages and collect samples with pre-sterilized buckets from the bridges. Two non-USGS stations on Whiteoak Bayou and one on Buffalo Bayou will also be sampled and flow will be measured. Samples will be analyzed for conventional parameters in the field and for FC and EC by North Water District Laboratory Services. In parallel, we will obtain rainfall data from the HCFCD network as well as the City stations.

Events will be limited to those that could be sampled during daylight hours. Samples will be collected as soon as possible on the rising limb of the hydrograph, and then at roughly 3-hr intervals till dark. To track the expected decline in bacteria levels on the falling limb, samples will be collected the next morning and then at 12-hr intervals for the next two days. See Figure 5.3 for the location of the monitoring sites and Table 5.1 for the schedule.

5.4 CONCENTRATION DYNAMICS IN THE BAYOUS

Once a disinfected discharge enters the bayous it becomes subject to a very different set of environmental conditions. After chlorine has been eliminated by contact with organic matter and sediments, it may be possible for indicator bacteria to either reactivate (assuming they were stunned but not killed by the disinfectant) or regrow (assuming some cells survived and there was sufficient nutrients to support growth of the cells that also perform well on the FC or EC tests). Either mechanism, or some other mechanism not well defined, can result in higher stream levels than are typically seen in wastewater effluents.

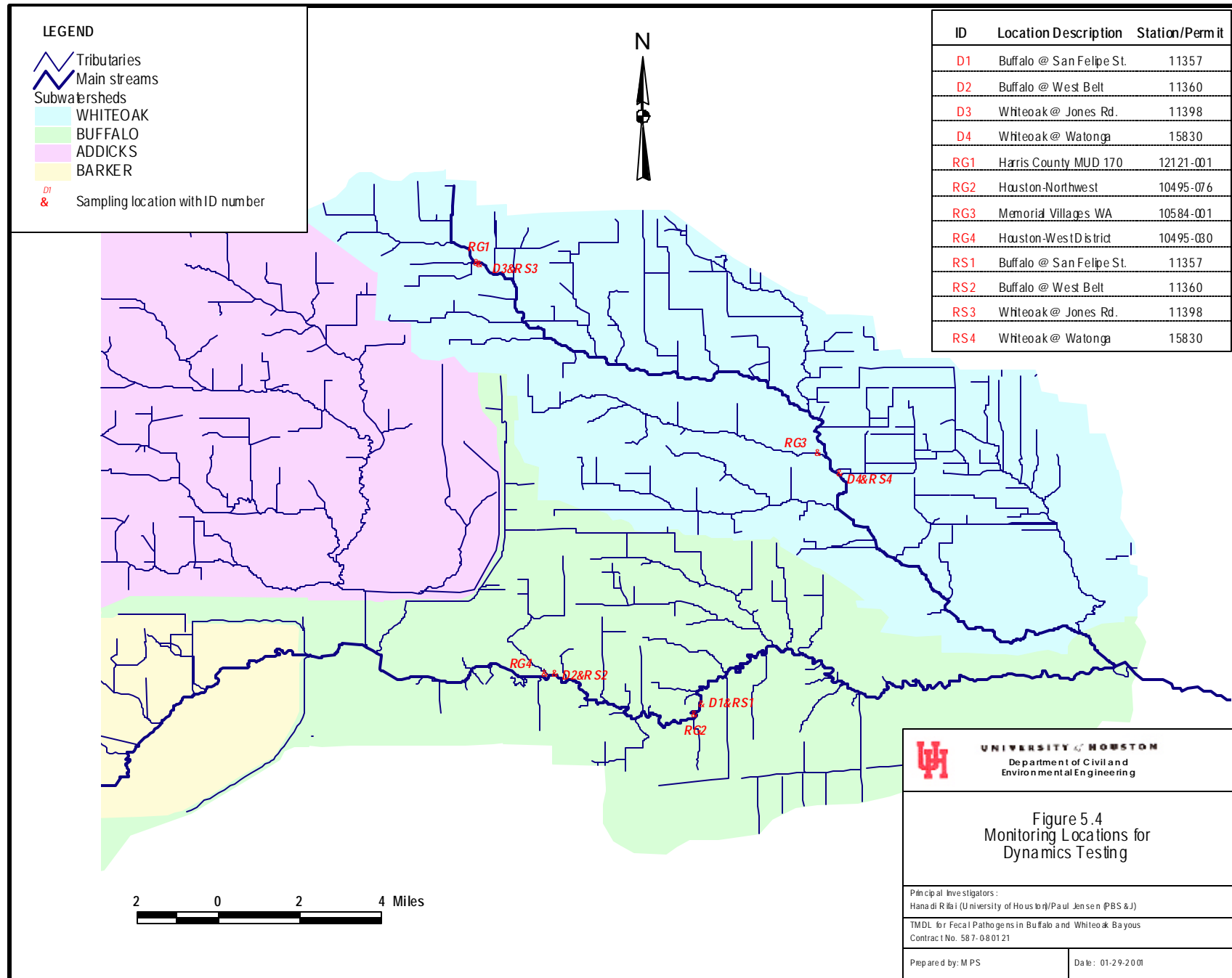


To study these regrowth or resupply dynamics, we propose a series of field and laboratory experiments where we seek to isolate various mechanisms and document changes and rates. There will be three main elements: in-stream dynamics (normal rates of change), rates of change influenced by freshwater (regrowth), and rates of change affected by resupply from stream sediments.

The in-stream dynamics tests will comprise a series of *in-situ* chambers placed in Buffalo and Whiteoak bayous. The chambers will be attached to round floats so the edge of the chamber is above the water surface, but the water inside the chamber will be exposed to the air and true ambient conditions. The floats will be tethered or anchored so that they could be easily sampled. To avoid contamination from bird droppings, the floats will be fitted with a clear plastic “umbrella”. It is recognized that if a significant flow increase occurs, the containers will be lost. Duplicate EC subsamples will be collected from each chamber the first morning and evening after installation of the chambers and the morning and evening following installation. In addition, routine probe parameters will be monitored from the collected samples. Each set of chambers will have a control, either in the ambient water (water collected from the stream approximately tracking the water initially sampled as it moved downstream under the influence of sediment and intervening sources) or a chamber without additions. A DI water blank will be prepared for each batch of bags. Chamber conditions will be varied to further examine the exact dynamics occurring at the bayous. Some of the variations in chamber conditions are as follows: post-rain versus dry conditions, effluent mixes versus natural site water to assess regrowth, and effluent or site water mixed with channel sediments to obtain an indication of the effect of solids content on rates. Tracking the bagged and water samples will

provide an indication of the growth and dieoff rates as influenced by day-night light intensity, sediment levels, organic strength and isolation from the sediment. Figure 5.4 shows a map with the proposed locations for this component. We expect this testing process to evolve with model calibration and development, with model needs guiding the testing decisions.

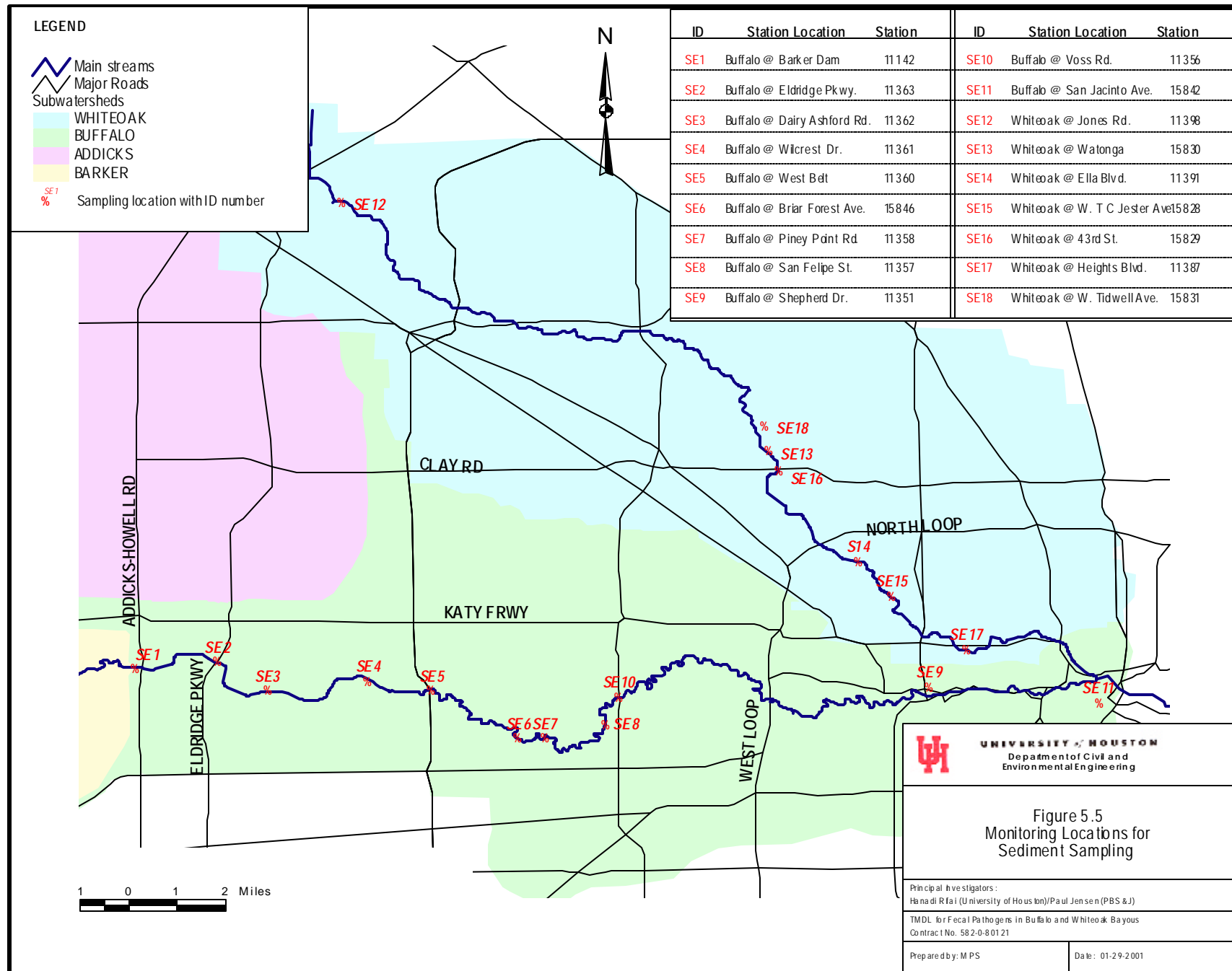
For the regrowth studies, bayou water samples will be collected under dry weather conditions from upstream, effluent and from the mixing zone downstream from four large domestic wastewater treatment plants (preliminary locations are mapped on Figure 5.4). The samples will be collected in new plastic garbage sacks (presumed to be free of significant bacterial contamination). All samples will be checked in the field for residual chlorine. Dechlorination will be performed if necessary. An aliquot of each water sample will be analyzed for N and P forms, TOC, CBOD₅, and TSS by North Water District Laboratory Services. Duplicate subsamples will be collected at the start and tested for bacterial levels. The collected effluent and upstream water will be mixed together to simulate the downstream mixing zone. This would yield two sets of bottles, with one set from the downstream mixing zone and one simulating the same conditions. The samples will be taken back to the laboratory where conditions such as sunlight and temperature could be controlled and gentle mixing will be provided with a small flow of air. Subsamples will then be withdrawn after a one to two day period and analyzed for EC levels with IDEXX. If significant increases in bacteria concentrations are noted, regrowth of shocked cells may be occurring. If the mixing zone concentrations increases, and no bacteria are detected in the effluent, this might suggest that nutrients in the effluent were stimulating growth in bacteria from upstream.



Resupply of bacteria from sediments will be assessed by collecting sediment grab samples at locations removed from point sources (Figure 5.4) and mixing a predetermined amount (1 mL, 10 mL, and 100 mL) of sediment unconsolidated surface mud with 1L of previously collected and autoclaved stream water. Three aliquots will be made from each water-sediment mixture. A control using DI water will be used as well. The water-sediment mixtures will be shaken and then an initial portion of each sample will be poured off for EC analysis. The bottles will be maintained near bayou water temperatures in low light conditions and resampled after the first and second days for EC and routine probe parameters. It is expected that differences in the initial level of bacteria concentrations will be proportional to the initial sediment addition. Further increases in bacteria concentrations following incubation would be evidence of bacteria resupply. The results of the experiment should not be affected by low dissolved oxygen occurring after 1-2 days. Additional tests will be conducted by allowing the top of the bottles to be open to ensure DO similar to bayou levels, and EC analysis will be conducted again.

Standard statistical tests for means and variance using Excel spreadsheets will be used to analyze the data to identify significant trends in data obtained from the dynamics tests.

Finally, to determine baseline sediment concentrations, EC levels will be measured in up to 20 sediment samples. Analyses of sediment samples will be conducted only if the results from the dynamics test show that resuspension is a significant source of EC into the Buffalo and Whiteoak Bayous. Preliminary locations for sediment sampling are shown in Figure 5.5. This locations, however, may change depending on model



segmentation and needs. In addition to EC analysis, sediment samples will be analyzed to obtain particle size data.

CHAPTER 6

STAKEHOLDER/PUBLIC EDUCATION AND INVOLVEMENT

6.1 SUMMARY OF SUPPORT ACTIVITIES

In accordance with this task, the project team completed the following activities:

- Development of informational materials summarizing the technical aspects of the project for electronic or paper distribution at stakeholder meetings. These materials included a summary of the quarterly reports 1 and 2, maps, and a document with a draft monitoring plan as well as the proposed modeling activities.
- Participation in three stakeholder meetings (May 3,2000; January 25, 2001; and March 8, 2001).
- Preparation and presentation of technical information at stakeholder meetings. Responding to questions and information requests from stakeholders and providing rationale for whether or not certain requests by stakeholders for refinement in technical analysis can or cannot be achieved.
- Providing technical expertise on issues of microbiological public health, urban wastewater infrastructure and water quality.

6.2 TECHNICAL PRESENTATIONS AT STAKEHOLDER MEETINGS

Copies of the technical presentations given at the stakeholder meetings are included in Appendix E.

6.3 RESPONSE TO STAKEHOLDERS' COMMENTS/QUESTIONS

The project team modified reports and plans, when appropriate, according to stakeholder input. Below is a list of comments received from stakeholders during the meetings or via email and their respective responses.

Theo Glanton's comments on Work Plan

Comment	Corrective Action	Response
Under the point source monitoring section, the plan is to collect both low and high flow values from WWTP of less than 1 MGD. It is suggested that some of the plant effluent flow rates should also be recorded when the samples are collected. The data could then be compared to reported average flow values to verify that high and low flow conditions are being sampled.		Flow rate will be measured every time a sample is collected. Point source sampling description reads: <i>"...The sampling will include doing a field measurement of residual chlorine, corrected for manganese interference, estimating the flow, estimating conventional chemical parameters (see Table 1) and collecting water samples for laboratory analyses..."</i>
In the Illicit discharge monitoring section it states that residual chlorine and ammonia testing will be the determining factors for Fecal Coliform (FC) analysis. Field experience has demonstrated that ammonia analysis is an excellent tracking tool and an indicator of fecal contamination. However, ammonia analysis with a field test kit is reliable down to about .5 mg/l. Thus the detection limit is somewhere around an eight to ten percent sewage contamination level. By contrast, FC bacteria can indicate sewage contamination down to a less than one percent	Field ammonia analysis is a good tool, but it is only part of the toolbox used by the City of Houston and it requires field experience and good judgement to obtain consistent results. I would like to suggest that two criteria be added. One, that some percentage of any dry weather line flow be considered for FC bacteria sampling. Two, the observation of any sewage fungus (Sphaerotilus) should be considered a trigger for sample collection. Sphaerotilus will appear submerged in the flow and attached to a hard surface. The color of the growth is	The Illicit discharges monitoring section was updated as follows: <i>"...If the water is not chlorinated, two different criteria will be applied to determine whether samples will be collected for bacterial, TOC and TSS analyses. First, the presence of ammonia using a field test kit will be assumed as an indicator of fecal contamination and, therefore, samples will be collected. Second, the observation of Sphaerotilus will be considered a trigger for sample collection. Sphaerotilus is a non-fungus aerobic bacteria that prefers habitats with slowly running fresh water contaminated with sewage and grows attached to submerged plants, rods, and other solid objects. Sphaerotilus will appear submerged in the flow and attached to a hard surface. The</i>

Comment	Corrective Action	Response
contamination level. Experience has demonstrated that FC may be present at the 100,000 C/dl concentration level and the field ammonia test value, in some cases, will not clearly indicate a contamination problem.	a gray to white hue (see Standard Methods for additional information).	<i>color of the growth is a gray to white hue (see Standard Methods for additional information). “</i>
The illicit discharge monitoring section identifies an outline of the pilot areas and both of the locations are in sections where the sewer systems are comparatively new relative to age of the City of Houston. Further, the plan indicates that the sampling points will be based on locatable outfalls.	It is suggested that the use of a canoe in the Buffalo Bayou watershed could both expand the sampling area and insure detailed coverage. It is suggested that both equipment and guide services could be obtained from either the Houston Canoe Club or White Water Experience for a nominal fee. In a seven-day period, the area from the upstream point of the proposed location to Shepherd Street Bridge could be covered and with a canoe to transport sampling equipment and personnel 98% of all the outfalls could be located and sampled. Further, some sampling be done outside of the pilot areas, specifically it is recommended that outfalls inside the loop in the down town area be included. To target these areas it is recommended that only the large diameter storm sewers be examined. The large diameter lines represent large drainage areas and this should offer the most coverage for potential dry weather flow for the least amount of effort.	Point well taken. Text was modified to reflect this comment and different pilot areas were suggested. <i>“... For sampling in the Buffalo Bayou, a canoe will be used to both expand the sampling area and insure detailed coverage. [...]Further, for sampling of the remaining segments of Buffalo Bayou as well as sampling of Whiteoak Bayous and the tributaries to both bayous, the crews will walk pilot areas determined after field recognition. The criteria to select those areas include diameter of the stormsewers (sampling will focus mainly on large diameter lines since they represent large drainage areas and this should offer the most coverage for potential dry weather flow) and age of the lines. Appendix B contains a map of the preliminary pilot areas.”</i>
In [dynamics] section regarding the in-situ testing, the use of plastic bags are	It is recommended that the bags be qualified as being a clear plastic type.	In-stream dynamics test description now reads: <i>“...The samples will be collected</i>

Comment	Corrective Action	Response
identified.		<i>in new plastic garbage sacks (presumed to be free of significant bacterial contamination)...</i>

Theo Glanton's comments on Data Analysis and Modeling Plan

Comment	Corrective Action	Response
The flow and concentration data presented at the January TMDL Stakeholders meeting limited the flow relationship to greater than or less than 100 cubic feet per second. Based on a review of the charts, the analysis break point appears to be established on the 50% of the flow range value. Further, data analysis was limited to only two bridge locations; Shepard and West Belt.	The flow analysis should be expanded to look at the extreme low flow and high flow FC concentrations. It is suggested that one and two standard deviations boundary values be considered or the upper and lower 10% of the flow range values as an alternative. This approach could allow for the division of the data into six quartiles where each may have separate trends. The purpose is to get a definitive view of the bayou and FC relationship during the dry weather periods, wet weather periods and mixed dry and wet weather periods.	Low vs high flow data were compared assuming the boundary at 10%, 20%, 30%, 40%, 75% and 90% (Chapter 2)
	The data and data subsets should be analyzed for randomness. If a data set is not found to be random then some trend can and should be extrapolated. It is understood that the regression analysis correlation coefficient will most likely be rather poor, but as an interpretation of a generalized direction of the trend, it could be a useful tool.	Trend analyses were performed on the quartiles defined above (Chapter 2).
	The data should be viewed with a focus towards three main areas; outside the City of Houston's jurisdiction (i.e. above	Agree. Model activities will definitely consider the differences among these three areas regarding source contributions, flow, and control

Comment	Corrective Action	Response
	Barker Dam), above tidal (i.e. the Shepard Street bridge and above) and below tidal. The justification for these boundaries is that in each separate area represent a section where a distinct and separate solution will most likely be required for both the study and resolution of the issues.	actions and management measures.
	It is suggested that the data trending analysis for seasonal periods be included (i.e. winter and summer). Past work has looked at DO concentrations in both winter and summer conditions and it showed seasonal variation. The data was normalized to eliminate the temperature effect by calculating DO as a percent saturation. It was found that temperature was not the controlling factor in the season DO variations. It was postulated that the macrophyte population was the controlling factor for the seasonal changes in DO concentration. It is unknown whether FC bacteria are an opportunistic species; however, limited testing and field experiences indicate that FC bacteria propagate given the appropriate conditions. If the FC bacteria find the lysis of macrophytes a suitable environment then some seasonal variations in concentration should be detectable.	Chapter 2 presents a comparison of winter vs. summer data.

Kim Phillip's comments on QAPP

Comment	Corrective Action	Response
The mTEC method is far too technique dependant to be used in lab where there is not a microbiologist (or other analyst) that has been properly trained in the method, including verification with a commercial multi-test system and extensive quality control.	I recommend using the IDEXX Colilert Quanti-Tray 2000 method for E. coli. It is very simple to use, is complete in 18 or 24 hours (whichever you choose), and requires much less training for competency.	EC will be analyzed using Idexx Colilert (see Table 1 of the QAPP and Chapter 5 of this report)
Contract labs (or any other lab) need to show evidence of experience and acceptable quality assurance/control for any methods that you contract them for.		Agree. The SOPs will be reviewed and retained by the University of Houston Project Manager.
Standard Methods, 20th Edition, section 9060 B. 1.c.&d. addresses holding times for non-potable and other types of water. If the sample is to be used for compliance purposes the holding time is 6 hours and the sample must be analyzed within 2 hours of receipt in the lab. If the sample is not for compliance purposes, the holding time is 24 hrs from collection until it is analyzed. All samples must be kept at 10°C or below. Holding times should be consistent throughout the project. Testing of any kind in the field should be done only in extreme circumstances where there is no way to meet the holding time.		Holding time will be 6+2 hours because it corresponds with Surface Water Quality Monitoring Procedures and is necessary for inclusion of data into the TRACS database. This holding time will be consistent throughout the project as all the sampling and analysis activities will follow the QAPP. Procedures to ensure that the sampling handling (preservation, holding time, etc) is appropriate are delineated in Section B2. Bacterial analyses will not be conducted at the field under any circumstance.
I don't understand footnote 3 in table 2. "Samples will be resuspended in nutrient broth and then analyzed following the water method." What samples and what water		Footnote now reads: "Bacteria will be transferred from the sediment sample to an aqueous phase and subsequently analyzed using IDEXX method."

Comment	Corrective Action	Response
method? Suspending any sample in nutrient broth would invalidate the sample.		
I think the sediment testing is a very good idea and will yield some very interesting and hopefully helpful information. But, sediment should not be analyzed using membrane filtration. The MPN (most probable number) method is what is recommended for sediment testing. The MPN can be obtained by using the traditional Multiple Tube Fermentation (MTF) method or IDEXX Colilert Quanti-tray.		We were told by TNRCC that IDEXX was not recommended for sediments (comments to QAPP revision 2). We checked with North Water District Laboratory Services and they have successfully analyzed soil samples using filtration (with high dilutions). We also found some papers later reporting sediment data (FC mainly) using membrane filtration.
The name of the project infers that actual fecal pathogens other than coliforms will be monitored. This is misleading. The term "indicator bacteria" would be more appropriate.		Fecal Pathogens is the name that appears in the contract with TNRCC.
[In section A7] RPDs are not applicable to microbiology. The correct method for calculating precision for microbiological analysis can be found in Standard Methods 20th Edition section 9020 B.8.b.		<p>The following statements were added to the "Precision" description:</p> <p><i>"For microbiological analyses, the method to be used for calculating precision is the one outlined in Standard Methods 20th Edition section 9020 B.8.b.</i></p> <p>$RPD_{bacteria} = (\log X_1 - \log X_2)$</p> <p><i>The $RPD_{bacteria}$ should be lower than $3.27 R_{log}/n$, where R_{log} is the difference in the natural log of duplicates for the first 15 positive samples."</i></p>

Comments from stakeholder meeting on March 8

Comment	Corrective Action	Response
Sample point sources during wet weather conditions.		Out of the scope of this project.

Comment	Corrective Action	Response
Include bypasses in monitoring plan		
Include bypasses in the model.		Model is dynamic so will include both high and low flow conditions.
Sample wet weather facilities		Out of the scope of this project.
11 out of 128 small WWTP are industrial so it may not be useful to sample them.		8 out of the 11 industrial WWTP do not treat domestic sewage, thus, they were removed from the list of plants to be sampled (Table 6).
One sampling station in Whiteoak Bayou is not enough to calibrate the model.	Include more sampling stations (non-USGS) and estimate flow.	Two stations (11398 and 15831) were added to the runoff sampling sites. Flow will be estimated using a rating curve.
It was pointed out that the IDEXX method was going to be used by the TNRCC Statewide for the monitoring of E.coli and enterococcus. So, that should be the method to be used in this project.		EC will be analyzed using IDEXX Colilert.
Run blanks for the in-stream dynamics tests and measure DO and temperature.		OK. See description of in-stream dynamics studies
In the chamber experiment, will samples be taken from ambient waters. If yes, an "equipment control" for the garbage bags should be used. It was suggested testing dissolved oxygen and temperature in ambient waters and in garbage bags.		Yes, samples will be taken from ambient waters. Conventional field parameters (including DO) will be measured in the ambient water as a control (see Section 5.4).
Are the samples for regrowth testing going to be capped - if so, BOD may be a problem.		The samples will remain uncapped.

CHAPTER 7

CONCLUSIONS

The following activities were conducted to complete the tasks listed in the Work Plan for Work Order No. 582-0-80121-01 for the Bacteria Project: literature review on the sources, and fate of bacteria and indicators of fecal contamination; assessment of levels and trends of fecal coliform in the Buffalo and Whiteoak Bayous; assessment of potential sources of bacteria to the project area; selection of numerical model to be used to aid in load allocations, development of a monitoring plan with its respective Quality Assurance Program Plan (QAPP); and participation in stakeholder/public outreach activities.

There have been four agencies collecting indicator bacteria data in the two bayous over the years. Almost all of these data have been collected from bridges with similar methods. The major differences appear to be in the decision of when to sample. The agency with the fewest samples is the USGS. A relatively high proportion of the samples reported by the USGS were obtained at higher flows, probably reflecting an involvement with stormwater event sampling.

The TNRCC ranks next in terms of number of samples, averaging about 10 individual samples per year in each bayou (typically quarterly sampling at 3 stations). Over the period 1992 to 1999 the distribution of sampling days is similar to the distribution of flows. However, in the period 1995 to 1999 a higher proportion of samples was collected during low flow periods. This would be consistent with TNRCC

monitoring guidance that suggests avoiding sampling for bacteria during and immediately after rains.

The H&HS arm of the City of Houston contributed a substantially higher number of samples. Their effort from 1995 to 1999 averaged 23 samples per month in Buffalo and 10 samples per month in Whiteoak bayou watersheds. Most of the samples were collected on the main stems of the bayous but about 47% were obtained from tributaries. These monitoring data appear to follow a regular schedule, with the distribution of flows on sampling days roughly equivalent to the distribution of flows overall.

The most populated data set in the historical record was that contributed by PW&E of the City of Houston. This unit operates the City's water and wastewater system. The Wastewater Operations portion of PW&E began bayou monitoring in 1983, primarily to help identify problems with treatment plants and the collection system. With that emphasis, the monitoring was specifically directed to lower flows because it is very difficult to detect point source effects at high flows when urban runoff dominates. The rate of sampling varied over the years, averaging 22 samples per month in the two systems.

In comparing the data it was found that all four data sources were comparable provided that only data obtained when the flow at major gages was less than a screening value that approximated the median flow. With that restriction, all the data were combined at each station to test for temporal and spatial trends.

The temporal trend analysis had to be limited to the period 1992 on because before that time the effect of residual chlorine in the bayous appeared to cause anomalous low values. With data from 1992 on, most stations had no significant trend. However,

several stations appear to show a downward trend in FC concentrations that is significantly different from zero with a confidence level of 95%. Even where a trend does not rise to the level of statistical significance, the slopes are almost always negative, further supporting the idea that there has been a reduction in the FC concentrations over time.

With spatial information there appear to be two broad ideas of interest. The first is that on both Buffalo and Whiteoak bayous the average concentrations appear to increase from upstream to downstream. The increase is on the order of a factor of two in both systems. While this is not huge on the log scale of FC data, it may be significant in interpreting causes. For example, going from upstream to downstream, the density and age of development increase in both bayou watersheds.

Another general observation is that long-term geometric means of Whiteoak Bayou appear to be higher than those of Buffalo Bayou, also by about a factor of two. These two observations may be useful in the investigative work needed to understand the causes of the dry weather FC concentrations.

Data at higher flows (collected on days where the reference gage flow was higher than the median value) are moderately higher than low flow data. Examining data where the flow was above the 90th percentile, the trend was for those data to be markedly higher in FC concentrations for Whiteoak Bayou but not for Buffalo Bayou.

Nine potential sources of the high indicator bacteria levels observed in the bayou were identified. These potential sources include effluent from point sources not disinfected completely, regrowth/reactivation of bacteria after point source discharge, untreated sewage, illicit dischargers, untreated sewage from failed on-site wastewater

systems located in un-sewered areas, bacteria from upstream sources, avian sources, runoff, and stream sediments.

Data gatherings and analysis of the nine identified potential sources indicated that point sources, illegal discharges, sediments, runoff, and upstream sources are relatively significant contributors to bacteria in the bayous. There were no data on contributions from avian sources and regrowth or reactivation of bacteria in disinfected water, so they could not be evaluated. A comparison of total annual loads from point sources, illegal discharges and runoff indicates that non-point sources are one order of magnitude greater than those from point sources and up to three orders of magnitude greater than loads from overflow and bypasses. It should be noted, however, that runoff is a shorter term dynamic phenomenon that affects FC conditions in the bayous on an intermittent basis.

Additional monitoring of the bayous would include four components as follows:

- Monitoring of point sources,
- Searches for illicit discharges in both sewerred and unsewerred areas,
- Moderate runoff event sampling. and
- Analyses of concentration dynamics in the bayous.

A review of suitable models to quantify the fate and transport of the indicator bacteria suggested that HSPF is the best model choice for the purposes of this TMDL study.

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APPENDIX A

RAW DATABASE AND

SUMMARY OF COMPILED DATA

Table A.1 Fecal Coliform Database

Table A.1 Summary of compiled fecal pathogen data (cfu/100 mL)

Station ID	Location (from upstream to downstream)	Minimum	Maximum	Geometric Mean
BUFFALO BAYOU	11142 Barker Dam	9	160,000	843
	11345 McKee St	100	200,000	3,990
	11347 Main St	400	160,000	7,323
	11351 Shepherd Dr	1	200,000	3,912
	11353 IH 610	99	99,000	1,507
	11354 Woodway Dr	1	223,000	2,054
	11356 Voss Rd	99	200,000	3,394
	11357 San Felipe St	1	160,000	1,156
	11358 Piney Point Rd	110	60,000	2,498
	11359 Gessner Dr	1	90,000	994
	11360 West Belt	1	220,000	1,067
	11361 Wilcrest Dr	1	23,000	1,358
	11362 Dairy Ashford Rd	1	130,000	852
	11363 Eldridge Rd	9	22,000	641
	11364 SH 6	9	33,000	607
	15842 San Jacinto Ave	340	250,000	9,374
	15843 Sabine Ave	100	200,000	4,646
	15844 Westcott Ave	140	250,000	2,610
	15845 Chimney Rock Rd	9	150,000	1,741
	15846 Briar Forest Ave	1	130,000	799
WHITEOAK BAYOU	11385 Wrightwood St	230	350,000	8,123
	11387 Heights Blvd	72	160,000	5,540
	11388 Houston Ave	6,000	107,000	4
	11390 W. 34th St	9	200,000	1,892
	11391 Ella Blvd	9	200,000	2,494
	11398 Jones Rd	45	60,000	746
	15824 Girard Ave	9	1,000,000	11,387
	15825 Crocket Ave	160	210,000	8,182
	15826 Studemont Ave	9	200,000	3,294
	15827 N. Durham St	9	200,000	3,770
	15828 W.T.C. Jester Ave (nr W. 12th st)	9	200,000	2,307
	15829 W. 43rd St	9	200,000	667
	15830 Watonga	9	250,000	796
	15831 W. Tidwell Ave	9	200,000	1,216
	16637 W.T.C. Jester Ave (nr W. 34th st)	770	35,000	4,626
	16646 Confluence with Buffalo Bayou	780	5,500	2,579
	16647 S. Pacific RR Crossing	590	47,000	5,293

APPENDIX B

SELF-REPORTED FC DATA FROM PERMIT COMPLIANCE SYSTEM (PCS)

APPENDIX B

SELF-REPORTED FC DATA FROM PCS

NPDES No.	DAILY AVERAGE	DAILY MAXIMUM	DATE
	CONC (cfu/dL)	CONC (cfu/dL)	
TX0070971	< 1	< 1	9/30/91
TX0070971	< 1	< 1	12/31/91
TX0070971	< 2	< 2	3/31/92
TX0070971	7	7	6/30/92
TX0070971	< 1	< 1	9/30/92
TX0070971	< 1	< 1	12/31/92
TX0070971	< 1	< 1	3/31/93
TX0070971	< 1	< 1	6/30/93
TX0094307	< 1	< 1	6/30/93
TX0094307	< 1	< 1	6/30/93
TX0070971	< 1	< 1	9/30/93
TX0094307	< 1	< 1	9/30/93
TX0094307	< 1	< 1	9/30/93
TX0070971	< 1	< 1	12/31/93
TX0094307	< 1	< 1	12/31/93
TX0094307	< 1	< 1	12/31/93
TX0070971	< 1	< 1	3/31/94
TX0070971	5	5	6/30/94
TX0070971	5	5	9/30/94
TX0082830	4	4	9/30/98
TX0082830	4	4	9/30/98
TX0094307	10	10	9/30/98
TX0094307	10	10	9/30/98
TX0082830	< 2	< 2	12/31/98
TX0082830	< 2	< 2	12/31/98
TX0094307	10	10	12/31/98
TX0094307	10	10	12/31/98
TX0082830	28	28	3/31/99
TX0082830	28	28	3/31/99
TX0094307	15.87	40	3/31/99
TX0094307	15.87	40	3/31/99
TX0082830	18	18	6/30/99
TX0082830	18	18	6/30/99
TX0094307	10	10	6/30/99
TX0094307	10	10	6/30/99
TX0082830	12	12	9/30/99
TX0082830	12	12	9/30/99
TX0094307	10	10	9/30/99
TX0094307	10	10	9/30/99
TX0082830	< 2	< 2	12/31/99
TX0082830	< 2	< 2	12/31/99
TX0094307	2	2	12/31/99
TX0094307	2	2	12/31/99
TX0082830	< 2	< 2	3/31/00
TX0082830	< 2	< 2	3/31/00
TX0053325	6.74	40	4/30/91
TX0053325	7.94		6/30/91

APPENDIX B
SELF-REPORTED FC DATA FROM PCS

NPDES No.	DAILY AVERAGE	DAILY MAXIMUM	DATE
	CONC (cfu/dL)	CONC (cfu/dL)	
TX0053325	18.61	535	7/31/91
TX0053325	130	274	9/30/91
TX0053325	20.79	35.4	11/30/91
TX0053325	25.67	147.74	12/31/91
TX0053325	30.48	45.52	1/31/92
TX0053325	22.8	39.51	2/29/92
TX0053325	49.02	79.47	3/31/92
TX0053325	32.45	132.53	4/30/92
TX0053325	43.58	81.44	9/30/92
TX0053325	37.28	63.75	12/31/92
TX0053325	63.91	100.68	1/31/93
TX0053325	25.64	38.24	2/28/93
TX0053325	89.37	200.29	3/31/93
TX0053325	60.16	143.88	5/31/93
TX0053325	37.5	73.46	6/30/93
TX0053325	46.16	122.25	7/31/93
TX0053325	15.73	40.99	8/31/93
TX0053325	13.59	20.79	9/30/93
TX0053325	15.46	23.43	10/31/93
TX0053325	30.06	97.62	11/30/93
TX0053325	38.47	69.22	12/31/93
TX0053325	27.81	47.17	1/31/94
TX0053325	21.76	50.34	3/31/94
TX0053325	16.49	21.67	4/30/94
TX0053325	12.49	13.91	5/31/94
TX0053325	19.38	30.08	6/30/94
TX0053325	38.08	63.08	7/31/94
TX0053325	26.74	58.79	8/31/94
TX0053325	41.05	91.9	9/30/94
TX0053325	40.59	63.02	10/31/94
TX0053325	31.91	45.6	11/30/94
TX0053325	52.27	74.46	12/31/94
TX0053325	50.44	94.78	4/30/95
TX0053325	34.34	190.96	5/31/95
TX0053325	34.34	190.96	5/31/95
TX0053325	58.07	108.86	6/30/95
TX0053325	58.07	108.86	6/30/95
TX0053325	16.89	25.53	7/31/95
TX0053325	16.89	25.53	7/31/95
TX0053325	28.08	44.4	8/31/95
TX0053325	28.08	44.4	8/31/95
TX0053325	27.83	36.08	9/30/95
TX0053325	27.83	36.08	9/30/95
TX0053325	38.67	48.65	10/31/95
TX0053325	38.67	48.65	10/31/95
TX0053325	49.46	123.22	11/30/95
TX0053325	49.46	123.22	11/30/95

APPENDIX B

SELF-REPORTED FC DATA FROM PCS

NPDES No.	DAILY AVERAGE	DAILY MAXIMUM	DATE
	CONC (cfu/dL)	CONC (cfu/dL)	
TX0053325	25.86	37.45	12/31/95
TX0053325	25.86	37.45	12/31/95
TX0053325	17.48	25.22	1/31/96
TX0053325	17.48	25.22	1/31/96
TX0053325	17.95	40.66	2/29/96
TX0053325	17.95	40.66	2/29/96
TX0053325	44.48	76.88	3/31/96
TX0053325	44.48	76.88	3/31/96
TX0053325	36.29	65.29	4/30/96
TX0053325	36.29	65.29	4/30/96
TX0053325	31.89	43.69	5/31/96
TX0053325	31.89	43.69	5/31/96
TX0053325	20.18	27.68	6/30/96
TX0053325	20.18	27.68	6/30/96
TX0053325	21.53	75.61	7/31/96
TX0053325	21.53	75.61	7/31/96
TX0053325	15.51	19.05	8/31/96
TX0053325	15.51	19.05	8/31/96
TX0076651	10	10	8/31/96
TX0076651	10	10	8/31/96
TX0026352	< 1	< 1	9/30/96
TX0026875	1	2	9/30/96
TX0053325	31.47	55.57	9/30/96
TX0053325	31.47	55.57	9/30/96
TX0062235	1	1	9/30/96
TX0092908	< 10	< 10	9/30/96
TX0053325	20.52	28.97	10/31/96
TX0053325	20.52	28.97	10/31/96
TX0053325	20.4	203.9	11/30/96
TX0053325	20.4	203.9	11/30/96
TX0026352	1	1	12/31/96
TX0026697	< 1	< 1	12/31/96
TX0053325	16.9	20.9	12/31/96
TX0053325	16.9	20.9	12/31/96
TX0076651	< 10	< 10	12/31/96
TX0076651	< 10	< 10	12/31/96
TX0053325	16.3	27.7	1/31/97
TX0053325	16.3	27.7	1/31/97
TX0053325	14.6	21.5	2/28/97
TX0053325	14.6	21.5	2/28/97
TX0076651	< 10	< 10	2/28/97
TX0076651	< 10	< 10	2/28/97
TX0026247	30	30	3/31/97
TX0026352	< 2	< 2	3/31/97
TX0026697	< 1	< 1	3/31/97
TX0026875	0	0	3/31/97
TX0053325	20.9	29.8	3/31/97

APPENDIX B

SELF-REPORTED FC DATA FROM PCS

NPDES No.	DAILY AVERAGE	DAILY MAXIMUM	DATE
	CONC (cfu/dL)	CONC (cfu/dL)	
TX0053325	20.9	29.8	3/31/97
TX0062235	< 1	< 1	3/31/97
TX0092908	2	2	3/31/97
TX0026247	0	0	4/30/97
TX0053325	12.8	31.6	4/30/97
TX0053325	12.8	31.6	4/30/97
TX0026247	0	0	5/31/97
TX0053325	32.5	100	5/31/97
TX0053325	32.5	100	5/31/97
TX0026352	2	2	6/30/97
TX0026697	< 1	< 1	6/30/97
TX0053325	25	35.1	6/30/97
TX0053325	25	35.1	6/30/97
TX0062235	< 1	< 1	6/30/97
TX0093726	< 2	< 2	6/30/97
TX0093726	< 2	< 2	6/30/97
TX0053325	58.3	29.8	7/31/97
TX0053325	58.3	29.8	7/31/97
TX0053325	22.7	32.3	8/31/97
TX0053325	22.7	32.3	8/31/97
TX0026352	< 1	< 1	9/30/97
TX0026697	< 1	< 1	9/30/97
TX0053325	38.4	52.9	9/30/97
TX0053325	38.4	52.9	9/30/97
TX0062235	< 1	< 1	9/30/97
TX0092908	12	235	9/30/97
TX0093726	< 1	< 1	9/30/97
TX0093726	< 1	< 1	9/30/97
TX0053325	44.05	114.22	10/31/97
TX0053325	44.05	114.22	10/31/97
TX0026247	6	6	11/30/97
TX0053325	16.2	17.68	11/30/97
TX0053325	16.2	17.68	11/30/97
TX0026352	< 1	< 1	12/31/97
TX0026697	< 1	< 1	12/31/97
TX0053325	13.42	14.21	12/31/97
TX0053325	13.42	14.21	12/31/97
TX0062235	1	1	12/31/97
TX0076651	10	10	12/31/97
TX0076651	10	10	12/31/97
TX0092908	14	30	12/31/97
TX0093726	< 1	< 1	12/31/97
TX0093726	< 1	< 1	12/31/97
TX0053325	16.31	27.31	1/31/98
TX0053325	16.31	27.31	1/31/98
TX0053325	18.72	24.29	2/28/98
TX0053325	18.72	24.29	2/28/98

APPENDIX B

SELF-REPORTED FC DATA FROM PCS

NPDES No.	DAILY AVERAGE	DAILY MAXIMUM	DATE
	CONC (cfu/dL)	CONC (cfu/dL)	
TX0026247	5	10	3/31/98
TX0026352	1	1	3/31/98
TX0026697	< 1	< 1	3/31/98
TX0026875	437	437	3/31/98
TX0053325	12.69	14.5	3/31/98
TX0053325	12.69	14.5	3/31/98
TX0062235	< 1	< 1	3/31/98
TX0092908	<13	20	3/31/98
TX0093726	4	4	3/31/98
TX0093726	4	4	3/31/98
TX0053325	10.61	12.19	4/30/98
TX0053325	10.61	12.19	4/30/98
TX0076651	10	10	4/30/98
TX0076651	10	10	4/30/98
TX0053325	16.6	39.06	5/31/98
TX0053325	16.6	39.06	5/31/98
TX0026247	9	25	6/30/98
TX0026352	< 1	< 1	6/30/98
TX0026697	2	2	6/30/98
TX0053325	20.95	28.49	6/30/98
TX0053325	20.95	28.49	6/30/98
TX0062235	< 1	< 1	6/30/98
TX0092908	< 10	< 10	6/30/98
TX0093726	< 1	< 1	6/30/98
TX0093726	< 1	< 1	6/30/98
TX0053325	23.42	40.81	7/31/98
TX0053325	23.42	40.81	7/31/98
TX0053325	17.45	24.86	8/31/98
TX0053325	17.45	24.86	8/31/98
TX0026247	1	1	9/30/98
TX0026352	< 1	< 1	9/30/98
TX0026697	< 1	< 1	9/30/98
TX0053325	35.42	61.85	9/30/98
TX0053325	35.42	61.85	9/30/98
TX0062235	< 1	< 1	9/30/98
TX0076651	10	10	9/30/98
TX0076651	10	10	9/30/98
TX0090115	1	1	9/30/98
TX0090735	< 2	< 2	9/30/98
TX0092908	< 10	< 10	9/30/98
TX0093726	< 1	< 1	9/30/98
TX0093726	< 1	< 1	9/30/98
TX0053325	18.59	56.58	10/31/98
TX0053325	18.59	56.58	10/31/98
TX0053325	16.4	25.21	11/30/98
TX0053325	16.4	25.21	11/30/98
TX0026247	3	10	12/31/98

APPENDIX B
SELF-REPORTED FC DATA FROM PCS

NPDES No.	DAILY AVERAGE	DAILY MAXIMUM	DATE
	CONC (cfu/dL)	CONC (cfu/dL)	
TX0026352	1	1	12/31/98
TX0026697	< 1	< 1	12/31/98
TX0053325	15.9	21.55	12/31/98
TX0053325	15.9	21.55	12/31/98
TX0062235	3	3	12/31/98
TX0076651	10	10	12/31/98
TX0076651	10	10	12/31/98
TX0090115	3	6	12/31/98
TX0090735	< 2	< 2	12/31/98
TX0092908	< 10	< 10	12/31/98
TX0093726	3	3	12/31/98
TX0093726	3	3	12/31/98
TX0053325	20.52	27.28	1/31/99
TX0053325	20.52	27.28	1/31/99
TX0053325	16.28	18.34	2/28/99
TX0053325	16.28	18.34	2/28/99
TX0026247	1	1	3/31/99
TX0026352	1	1	3/31/99
TX0026697	< 1	< 1	3/31/99
TX0053325	18.34	26.47	3/31/99
TX0053325	18.34	26.47	3/31/99
TX0062235	23	23	3/31/99
TX0076651	10	10	3/31/99
TX0076651	10	10	3/31/99
TX0090115	4	11	3/31/99
TX0090735	< 2	< 2	3/31/99
TX0092908	< 10	< 10	3/31/99
TX0093726	4	4	3/31/99
TX0093726	4	4	3/31/99
TX0053325	22	31.49	4/30/99
TX0053325	22	31.49	4/30/99
TX0053325	30.3	54.21	5/31/99
TX0053325	30.3	54.21	5/31/99
TX0026352	< 1	< 1	6/30/99
TX0026697	< 1	< 1	6/30/99
TX0053325	41.74	83.91	6/30/99
TX0053325	41.74	83.91	6/30/99
TX0062235	1	1	6/30/99
TX0076651	< 10	< 10	6/30/99
TX0076651	< 10	< 10	6/30/99
TX0090115	1	1	6/30/99
TX0090735	< 2	< 2	6/30/99
TX0092908	< 10	< 10	6/30/99
TX0093726	2	2	6/30/99
TX0093726	2	2	6/30/99
TX0053325	40.13	53.45	7/31/99
TX0053325	40.13	53.45	7/31/99

APPENDIX B

SELF-REPORTED FC DATA FROM PCS

NPDES No.	DAILY AVERAGE	DAILY MAXIMUM	DATE
	CONC (cfu/dL)	CONC (cfu/dL)	
TX0053325	60.54	124.7	8/31/99
TX0053325	60.54	124.7	8/31/99
TX0026247	24	24	9/30/99
TX0026352	< 1	< 1	9/30/99
TX0053325	20.19	32.34	9/30/99
TX0053325	20.19	32.34	9/30/99
TX0062235	< 1	< 1	9/30/99
TX0076651	10	10	9/30/99
TX0076651	10	10	9/30/99
TX0090115	1	1	9/30/99
TX0090735	82	82	9/30/99
TX0092908	12.6	20	9/30/99
TX0093726	< 1	< 1	9/30/99
TX0093726	< 1	< 1	9/30/99
TX0053325	15.4	21.67	10/31/99
TX0053325	15.4	21.67	10/31/99
TX0053325	26.44	27.12	11/30/99
TX0053325	26.44	27.12	11/30/99
TX0026247	4	4	12/31/99
TX0026697	2	2	12/31/99
TX0026875	1	1	12/31/99
TX0053325	47.96	154.286	12/31/99
TX0053325	47.96	154.286	12/31/99
TX0076651	< 10	< 10	12/31/99
TX0076651	< 10	< 10	12/31/99
TX0090115	1	1	12/31/99
TX0090735	96	96	12/31/99
TX0092908	22.2	110	12/31/99
TX0093726	< 1	< 1	12/31/99
TX0093726	< 1	< 1	12/31/99
TX0053325	39.94	211.42	1/31/00
TX0053325	39.94	211.42	1/31/00
TX0053325	21.04	33.67	2/29/00
TX0053325	21.04	33.67	2/29/00
TX0026247	< 1	< 1	3/31/00
TX0053325	13.27	18.57	3/31/00
TX0053325	13.27	18.57	3/31/00
TX0090115	1	2	3/31/00
TX0092908	< 10	< 10	3/31/00
TX0053325	18.24	114.28	4/30/00
TX0053325	18.24	114.28	4/30/00
TX0053325	19.91	55	5/31/00
TX0053325	19.91	55	5/31/00
TX0026247	24	72	6/30/00
TX0053325	14.57	22.85	6/30/00
TX0053325	14.57	22.85	6/30/00
TX0090115	0	0	6/30/00

APPENDIX B
SELF-REPORTED FC DATA FROM PCS

NPDES No.	DAILY AVERAGE	DAILY MAXIMUM	DATE
	CONC (cfu/dL)	CONC (cfu/dL)	
TX0053325	14.6	20	7/31/00
TX0053325	14.6	20	7/31/00
TX0053325	18.42	48.57	8/31/00
TX0053325	18.42	48.57	8/31/00

Data source: EPA Permit Compliance System (PCS). URL: www.epa.gov/enviro

APPENDIX C

OVERFLOW AND BYPASS DATABASES

C.1 From City of Houston PW&E

C.2 From Individual Permit Files

Table C.1 Database from City of Houston PW&E

Problem	Location	Description	Receiving stream	Key map	Permit	Date	Time	Volume	Unit
NORTHWEST QUADRANT	900W.FOREST @ BRITOAK	MAIN SEWER LINE STOPPEDUP OVERFLOW INTO SEWER.	BUFFALO BAYOU	489-B	TX0096172	02-Jan-95	07:00	7920	Gallons
NORTHWEST QUADRANT	E.32 1/2-LINK	SEWER MAIN LINE STOPPED UP& OVFLW.INTO STORM SW LN	BUFFALO BAYOU	453-T	TX0096172	04-Jan-96	11:06	3065	Gallons
WASTEWATER OPERATION	609 N.ELDRIDGE	#3 PUMP FAILED	BUFFALO BAYOU	488-G	TX0035017	13-Jan-96	00:01	110000	Gallons
WASTEWATER OPERATION	609 N.ELDRIDGE	#3 LP FAILED	BUFFALO BAYOU	488-G	TX0035017	13-Jan-96	16:00	10000	Gallons
SOUTHEAST QUADRANT	1511 PRESTON	SEWER MAIN BROKEN AT THE CONNECTION CAUSING SEWER	BUFFALO BAYOU	493-M	TX0096172	02-Feb-96	19:30	56	Gallons
NORTHWEST QUADRANT	8903 LANGFIELD	ROUTINE SEWER MAIN STOPPAGE CAUSING MANHOLE TO OVE	BUFFALO BAYOU	411-N	TX0057347	03-Feb-96	14:00	2340	Gallons
SOUTHEAST QUADRANT	4801 CANAL	BROKEN SEWER LINE.	BUFFALO BAYOU	494-P	TX0096172	15-Feb-96	17:52	1073	Gallons
SOUTHEAST QUADRANT	4426 CANAL	4X8 SEWER LIN STOPPAGE	BUFFALO BAYOU	494-P	TX0096172	15-Feb-96	19:31	4170	Gallons
NORTHWEST QUADRANT	611W.MONTGOMERY	STOPPAGE IN SEWER LINE	BUFFALO BAYOU	412-V	TX0096172	27-Feb-96	14:58	15	GPM
NORTHWEST QUADRANT	1300 PERTHSHIRE	8'MAIN LINE STOPPED UP WHICH CAUSED WASTEWATER TO	BUFFALO BAYOU	489-G	TX0063002	04-Mar-96	10:42	25	Gallons
NORTHEAST QUADRANT	6900 OLD CLINTON AT LATHROP	CONTRACTORS BYPASS PUMP DISCHARGE HOSE DEVELOPED	BUFFALO BAYOU	494-H	TX0096172	05-Mar-96	22:00	600	Gallons
WASTEWATER OPERATION	2015 RUNNELS	THERE WAS A LEAK FROM A CRACKED SEWER FORCE MAIN.	BUFFALO BAYOU	493-M	TX0096172	06-Mar-96	15:00	2000	Gallons
SOUTHEAST QUADRANT	6230 PINEWAY	12X18 ROUTINE STOPPAGE IN MAIN.	BUFFALO BAYOU	534-G	TX0096172	07-Mar-96	12:00	20	Gallons
SOUTHEAST QUADRANT	6230 PINEWAY	SEWER MAIN STOPPAGE DUE TO GREASE IN THE LINE.	BUFFALO BAYOU	534-G	TX0096172	12-Mar-96	09:49	20	GPM
WASTEWATER OPERATION	2015 RUNNELS	POWER FAILURE	BUFFALO BAYOU	493-M	TX0096172	14-Mar-96	13:00	5000	Gallons
NORTHWEST QUADRANT	1249 BLALOCK	ROUTINE SEWR MAIN STOPPAGE CAUSING RAW SEWER TO	BUFFALO BAYOU	450-Y	TX0096172	21-Mar-96	10:36	315	Gallons
SOUTHWEST QUADRANT	4015 WILMER	8" SEWER MAIN 8 FEET DEEP STOPPED UP CAUSING SEWER	BUFFALO BAYOU	494-S	TX0096172	03-Apr-96	09:34	4185	Gallons
NORTHWEST QUADRANT	1615 WEST CLAY	CONTRACTORS REPAIRING SEWER MAIN PLUGGED LINE.	BUFFALO BAYOU	492-R	TX0096172	17-Apr-96	16:15	15525	Gallons
SOUTHEAST QUADRANT	5647 LAWSON	ROUTINE STOPPAGE	BUFFALO BAYOU	534-C	TX0096172	23-Apr-96	12:20	300	Gallons
NORTHWEST QUADRANT	12507 WINDING BROOK LN.	ROUTINE STOPPAGE-CREW ON SITE	BUFFALO BAYOU	489-N	TX0035017	07-May-96	08:40	590	Gallons
SOUTHEAST QUADRANT	106 ALTON	ROUTINE STOPPAGE DUE TO A BROKEN SEWER MAIN	BUFFALO BAYOU	495-W	TX0096172	15-May-96	21:41	2940	Gallons
SOUTHEAST QUADRANT	6500 AVE.F AT BRADY	ROUTINE SEWER STOPPAGE	BUFFALO BAYOU	494-U	TX0105058	15-May-96	13:00	12600	Gallons
SOUTHWEST QUADRANT	13123 HERMITAGE	SEWER BACKING UP DUE TO BREAK IN THE LINE	BUFFALO BAYOU	489-L	TX0035019	16-May-96	09:02	1080	Gallons
NORTHWEST QUADRANT	1300 FOWLER	SEWER MAIN RELIEVING TO STORM SEWER	BUFFALO BAYOU	492-H	TX0096172	24-May-96	13:27	460	Gallons
SOUTHEAST QUADRANT	3226 N.MC GREGOR	ROUTINE STOPPAGE IN AN 8" SEWER MAIN	BUFFALO BAYOU	533-S	TX0105058	07-Jun-96	08:09	680	Gallons
SOUTHEAST QUADRANT	3938 FERNWOOD	ROUTINE STOPPAGE	BUFFALO BAYOU	533-H	TX0096172	10-Jun-96	11:25	118	Gallons
WASTEWATER OPERATION	2015 RUNNELS	POWER FAILURE-HL&P, NO POWER TO THE STATION	BUFFALO BAYOU	493-M	TX0096172	22-Jun-96	16:30	10000	Gallons
WASTEWATER OPERATION	4421 CRITES	HYDRAULIC OVERLOAD DUE TO HEAVY RAINFALL IN THE AR	BUFFALO BAYOU	494-P	TX0096172	23-Jun-96	13:00	4000	Gallons
WASTEWATER OPERATION	1600 SOUTH LOCKWOOD DR.	HEAVY RAIN /HYDRAULIC OVERLOAD	BUFFALO BAYOU	494-X	TX0062201	25-Jun-96	11:00	149000	Gallons
WASTEWATER OPERATION	4421 CRITES	HYDRAULIC OVERLOAD DUE TO HEAVY RAINFALL IN THE AR	BUFFALO BAYOU	494-P	TX0096172	25-Jun-96	14:00	60000	Gallons
SOUTHEAST QUADRANT	7606 THUROW	ROUTINE STOPPAGE DUE TO A BROKEN SEWER MAIN	BUFFALO BAYOU	535-N	TX0096172	22-Jul-96	14:43	10	G.P.M
WASTEWATER OPERATION	204 ASBURY	MAIN BREAKER KICKED OFF WHICH CAUSED WETWELL RISE	BUFFALO BAYOU	492-L	TX0096172	24-Jul-96	08:30	2000	Gallons
SOUTHEAST QUADRANT	212 NORWOOD	ROUTINE STOPPAGE-BROKEN SEWER MAIN CAUSING O/FLOW.	BUFFALO BAYOU	494-U	TX0096172	05-Aug-96	11:13	1320	Gallons
SOUTHEAST QUADRANT	100 NAGLE	6" SEWER MAIN STOPPED-UP	BUFFALO BAYOU	494-N	TX0096172	13-Aug-96	11:51	625	Gallons
NORTHWEST QUADRANT	1600 SHEPHER AT EIGEL	BROKEN SEWER MAIN CAUSED OVERFLOW INTO BAYOU.	BUFFALO BAYOU	492-H	TX0096172	27-Aug-96	13:19	825	Gallons
SOUTHEAST QUADRANT	1200 SIDNEY	ROUTINE STOPPSGE	BUFFALO BAYOU	494-S	TX0096172	28-Aug-96	13:52	1440	Gallons
SOUTHEAST QUADRANT	690 GLOBE	BROKEN SEWER MAIN CAUSING RAIN SEWER OVERFLOW	BUFFALO BAYOU	576-F	TX0096172	30-Aug-96	11:56	385	Gallons
SOUTHEAST QUADRANT	6309 BEEKMAN	ROUTINE STOPPAGE IN A SEWER MAIN.	BUFFALO BAYOU	534-N	TX0096172	01-Sep-96	11:45	960	Gallons
NORTHWEST QUADRANT	1712 KNOLL @ 8860 SPRG. BRANCH	6" CONCRETE SEWER LINE BROKE.	BUFFALO BAYOU	450-U	TX0096172	03-Sep-96	13:08	573	Gallons
SOUTHWEST QUADRANT	2047 W. GRAY	BROKEN SEWER MAIN IN THE PARKING LOT.	BUFFALO BAYOU	492-Q	TX0096172	16-Sep-96	10:59	42	Gallons
SOUTHWEST QUADRANT	2418 POTOMAC	CITY MAIN STOPPED-UP AND OVERFLOWING INTO S/S.	BUFFALO BAYOU	491-S	TX0062995	17-Sep-96	07:15	582	Gallons
SOUTHEAST QUADRANT	2100 GULF CENTRAL	ROUTINE STOPPAGE IN AN 10'X10" SEWER MAIN	BUFFALO BAYOU	534-B	TX0096172	24-Sep-96	22:08	1928	Gallons
SOUTHEAST QUADRANT	4924 GRIGGS	10'X10" SEWER MAIN BROKE CAUSING STOPPAGE,OVERFLOW	BUFFALO BAYOU	534-J	TX0096172	28-Sep-96	11:00	705	Gallons
SOUTHWEST QUADRANT	1922 MORSE	SEWER MAIN STOPPED UP	BUFFALO BAYOU	492-R	TX0062995	01-Oct-96	08:15	285	Gallons
SOUTHEAST QUADRANT	3030 HASBROOK	6"X 8" SEWER MAIN STOPPED UP CAUSING OVERFLOW	BUFFALO BAYOU	534-M	TX0096172	01-Oct-96	18:52	1720	Gallons
SOUTHEAST QUADRANT	6419 WESTSCOTT	ROUTINE STOPPAGE	BUFFALO BAYOU	492-F	TX0096172	01-Oct-96	21:40	9000	Gallons
NORTHWEST QUADRANT	8849 LONG POINT	10" X 10" SEWER MAIN STOPPED UP CAUSING OVERFLOW.	BUFFALO BAYOU	450-V	TX0096172	14-Oct-96	10:20	1580	Gallons
SOUTHEAST QUADRANT	4704 PARK	ROUTINE STOPPAGE.	BUFFALO BAYOU	494-T	TX0096172	15-Oct-96	10:05	223	Gallons
SOUTHEAST QUADRANT	406 HUTCHESON	ROUTINE STOPPAGE CAUSING RAW SEWER OVERFLOW.	BUFFALO BAYOU	494-N	TX0096172	22-Oct-96	13:03	399	Gallons
SOUTHEAST QUADRANT	3000 BREMOND	SEWER MAIN 6" X 8" STOPPE UP, CAUSING OVERFLOW.	BUFFALO BAYOU	493-2	TX0096172	24-Oct-96	17:06	46	Gallons
SOUTHEAST QUADRANT	910 FAIR OAKS	STOPPAGE IN 10" X 8" MAIN	BUFFALO BAYOU	494-Y	TX0096172	28-Oct-96	14:29	2115	Gallons
SOUTHEAST QUADRANT	401 SOUTH 72nd STREET	ROUTINE SEWER MAIN STOPPAGE.	BUFFALO BAYOU	494-Z	TX0096172	01-Nov-96	09:00	340	Gallons
WASTEWATER OPERATION	609 NORTH ELDRIDGE	POWER FAILURE DUE TO HL&P FUSE DROP	BUFFALO BAYOU	488-G	TX0035017	02-Dec-96	09:00	40000	Gallons
NORTHWEST QUADRANT	600 SANDMAN	SEWER MAIN STOPPED UP CAUSING OVERFLOW	BUFFALO BAYOU	492-L	TX0096172	07-Dec-96	11:50	2725	Gallons
NORTHWEST QUADRANT	1502 GLEN OAKS	SEWER MAIN HAS STOPPAGE.	BUFFALO BAYOU	492-C	TX009672	07-Dec-96	23:42	1550	Gallons
SOUTHEAST QUADRANT	6847 HARRISBURG	8" X 10' ROUTINE STOPPAGE	BUFFALO BAYOU	494-Z	TX0096172	09-Dec-96	17:29	132	Gallons
SOUTHEAST QUADRANT	6200 PINEWAY	8" X 8" SEWER MAIN STOPPAGE CAUSING OVERFLOW.	BUFFALO BAYOU	534-G	TX0096172	13-Dec-96	10:03	2133	Gallons
NORTHWEST QUADRANT	1524 WHITE OAK	SEWER MAIN STOPPAGE CAUSING OVERFLOW IN STORM SR.	BUFFALO BAYOU	493-C	TX0096172	13-Dec-96	10:45	345	Gallons
NORTHWEST QUADRANT	1800 DALLAS	STOPPED UP SEWER MAIN 8"X8".	BUFFALO BAYOU	493-R	TX0096172	05-Jan-97	14:30	15	GPM

Problem	Location	Description	Receiving stream	Key map	Permit	Date	Time	Volume	Unit
NORTHWEST QUADRANT	6203 BROWN BARK	SEWER MAIN STOPPED UP CAUSING RAW SEWER OVERFLOW.	BUFFALO BAYOU	451-F	TX0063011	06-Jan-97	13:30	825	Gallons
NORTHWEST QUADRANT	777 BATESWOOD	STOPPAGE IN SEWER LINE.	BUFFALO BAYOU	489-E	TX0063002	08-Jan-97	22:34	780	Gallons
NORTHWEST QUADRANT	802 WALKWOOD COURT	ELECTRICAL OUTAGE AT THE LIFT STATION.	BUFFALO BAYOU	488-E	TX0063002	19-Jan-97	16:00	8100	Gallons
SOUTHEAST QUADRANT	2502 DELWIN	STOPPAGE FOUND IN AN 8X10 LINE.	BUFFALO BAYOU	576-F	TX0096172	29-Jan-97	20:01	670	Gallons
SOUTHEAST QUADRANT	7623 BROADVIEW	ROUTINE 10 X 10 MAIN STOPPAGE	BUFFALO BAYOU	535-W	TX0096172	02-Feb-97	13:43	3430	Gallons
SOUTHEAST QUADRANT	805 DUMBLE AT WALKER	ROUTINE STOPPAGE IN SEWER LINE FLOWING INTO S.S.	BUFFALO BAYOU	494-X	TX0096172	06-Feb-97	16:53	61	Gallons
WASTEWATER OPERATION	7909 1/2 MARKET STREET	AIR RELIEVE VALVE BLEW OFF AND SPILLED RAW SEWER.	BUFFALO BAYOU	495-F	TX0096172	06-Feb-97	19:30	50	Gallons
WASTEWATER OPERATION	8300 MARKET STREET	BROKEN FORCE MAIN SPILLED RAW SEWER	BUFFALO BAYOU	495-F	TX0096172	11-Feb-97	06:30	1500	Gallons
SOUTHWEST QUADRANT	1500 TAFT @ ALLEN PARKWAY	HYDRAULIC OVERLOAD DUE TO HEAVY RAINFALL	BUFFALO BAYOU	493-J	TX0034924	12-Mar-97	09:00	36000	Gallons
SOUTHWEST QUADRANT	1500 TAFT AT ALLEN PARKWAY	HYDRAULIC OVERLOAD DUE TO HEAVY RAINFALL	BUFFALO BAYOU	493-J	TX0034924	12-Mar-97	09:00	17500	Gallons
WASTEWATER OPERATION	10810 CRANBROOK	HYDRAULIC OVERLOAD DUE TO HEAVY RAINFALL	BUFFALO BAYOU	489-L	TX0063002	12-Mar-97	07:00	25000	Gallons
SOUTHWEST QUADRANT	1000 MONTROSE @ ALLEN PARKWAY	HYDRAULIC OVERFLOW DUE TO HEAVY RAINFALL	BUFFALO BYAOU	493-J	TX0034924	12-Mar-97	09:00	19500	Gallons
NORTHEAST QUADRANT	100 BLOCK TRAVIS AT COMMERCE	HIGH RAINWATER AT 100 TRAVIS	BUFFALO BAYOU	493-L	TX0096172	18-Mar-97	20:51	30400	Gallons
SOUTH EAST QUADRANT	543 N. SUPER	6 x 8 ROUTINE STOPPAGES IN LINE	BUFFALO BAYOU	494-P	TX0096172	21-Mar-97	17:47	708	Gallons
SOUTHEAST QUADRANT	592 NORTH EASTWOOD	STOPPED-UP 6"x6" SEWER MAIN CAUSING OVERFLOW.	BUFFALO BAYOU	494-P	TX0096172	26-Mar-97	18:58	141	Gallons
SOUTHEAST QUADRANT	542 N. EASTWOOD	6"x6" SEWER MAIN STOPPED-UP CAUSING SEWER OVERFLOW	BUFFALO BAYOU	494-P	TX0096172	02-Apr-97	13:02	2756	Gallons
SOUTHWEST QUADRANT	1500 TAFT AT ALLEN PARKWAY	HYDRAULIC OVERLOAD DUE TO HEAVY RAINFALL	BUFFALO BAYOU	493-J	TX0034924	04-Apr-97	07:00	30000	Gallons
WASTEWATER OPERATION	7700 WOODWAY	BREAKER BOX HAD BAD FUSES & HEAVY RAINFALL	BUFFALO BAYOU	490-R	TX0063002	04-Apr-97	14:30	32500	Gallons
WASTEWATER OPERATION	7700 WOODWAY	HYDRAULIC OVERLOAD DUE TO HEAVY RAINFALL	BUFFALO BAYOU	490-R	TX0063002	04-Apr-97	06:00	35000	Gallons
NORTHEAST QUADRANT	100 SAN JACINTO/ALLEN&WOODS ST	HYDRAULIC OVERLOAD DUE TO HEAVY RAINFALL	BUFFALO BAYOU	493-C	TX0096172	04-Apr-97	07:00	74250	Gallons
NORTHEAST QUADRANT	100 MILAM (N.OF BUFFALO BAYOU)	HYDRAULIC OVERLOAD DUE TO HEAVY RAINFALL	BUFFALO BAYOU	493-L	TX0096172	04-Apr-97	07:00	299250	Gallons
NORTHWEST QUADRANT	100 TRAVIS AT COMMERCE	HYDRAULIC OVERLOAD DUE TO HEAVY RAINFALL	BUFFALO BAYOU	493-L	TX0096172	04-Apr-97	07:00	630000	Gallons ON
SOUTHWEST QUADRANT	1400 WEST LOOP SOUTH	18"x26" SEWER MAIN RUNNING OVER THE BAYOU	BUFFALO BAYOU	491-R	TX0063002	12-Apr-97	19:57	500	GOING
WASTEWATER OPERATION	13702 RAILVILLE DRIVE	DISCHARGE VALVES TO VARIOUS TANKS ON,OVERFLOW ST.	BUFFALO BAYOU	488-F	TX0035017	24-Apr-97	:	500	Gallons
WASTEWATER OPERATION	4421 CRITES	HYSRAULIC OVERLOAD SUE TO HEAVY RAINFALL	BUFFALO BAYOU	494-P	TX0096172	25-Apr-97	21:00	65000	Gallons
SOUTHWEST QUADRANT	1500 TAFT @ ALLEN PARKWAY	HYDRAULIC OVERLOAD DUE TO HEAVY RAINFALL	BUFFALO BAYOU	493-J	TX0034924	26-Apr-97	19:00	24000	Gallons
WASTEWATER OPERATION	15350 MEMORIAL	POWER FAILURE AND WE CALLED HL&P	BUFFALO BAYOU	488-B	TX0035017	06-May-97	11:00	10000	Gallons
WASTEWATER OPERATION	4421 CRITES	HEAVY RAINFALL,LP#1 TRIPPED OUT & #2 LOST PRIME	BUFFALO BAYOU	494-P	TX0096172	09-May-97	17:30	35000	Gallons
WASTEWATER OPERATION	16500 PARK ROW	CLARIFIER EFFLUENT OVERFLOWED THE FILTER BASIN	BUFFALO BAYOU	447-Y	TX0026395	21-May-97	13:00	5000	Gallons
WASTEWATER OPERATION	7700 WOODWAY	OVERFLOW DUE TO POWER OUTAGE FROM LIGHTNING	BUFFALO BAYOU	490-R	TX0063002	21-May-97	22:00	3000	Gallons
SOUTHEAST QUADRANT	MILAM ST. @ BUFFALO BAYOU	HYDRAULIC OVERLOAD DUE TO LOCALIZED HEAVY RAINFALL	BUFFALO BAYOU	493-L	TX0096172	22-May-97	19:50	38000	Gallons
WASTEWATER OPERATION	15350 MEMORIAL DRIVE	ELECTRICAL PROBLEMS; LIFT PUMPS TRIPPED OFF	BUFFALO BAYOU	488-B	TX0035017	24-May-97	15:00	95000	Gallons
WASTEWATER OPERATION	7700 WOODWAY	HYDRAULIC OVERLOAD DUE TO HEAVY RAINFALL	BUFFALO BAYOU	490-R	TX0063002	24-May-97	16:30	10000	Gallons
WASTEWATER OPERATION	7700 WOODWAY	HYDRAULIC OVERLOAD FROM RAIN & BAD FUSES ON 2 PUMP	BUFFALO BAYOU	490-R	TX0063002	29-May-97	13:00	2307	Gallons
WASTEWATER OPERATION	950 HIGHWAY 6 SOUTH	SURGING INFLUENT CAUSED MLSS IN AERATION TO SPILL.	BUFFALO BAYOU	488-E	TX0090352	04-Jun-97		50	Gallons
SOUTHEAST QUADRANT	4605 BELL @ LOCKWOOD	STOPPAGE IN A 6' X 6" SEWER MAIN CAUSED OVERFLOW.	BUFFALO BAYOU	494-X	TX0096172	12-Jun-97	12:50	96	Gallons
SOUTHEAST QUADRANT	3500 PRESTON	8" X 9' SEWER MAIN STOPPED UP CAUSING OVERFLOW.	BUFFALO BAYOU	494-N	TX0096172	18-Jun-97	11:15	1670	Gallons
SOUTHEAST QUADRANT	2700 COMMERCE AT ENGELK	15" X 19' SEWER MAIN STOPPED UP CAUSING OVERFLOW.	BUFFALO BAYOU	494-N	TX0096172	26-Jun-97	17:55	1950	Gallons
SOUTHWEST QUADRANT	6600 WOODWAY AT VOSS	STOPPED-UP SEWER MAIN CAUSED OVERFLOW INTO BAYOU.	BUFFALO BAYOU	490-R	TX0062995	29-Jul-97	14:19	3180	Gallons
NORTHEAST QUADRANT	2635 TIM AT MONA	STOPPED UP SEWER MAIN	BUFFALO BAYOU	454-A	TX0096172	01-Aug-97	14:20	340	Gallons
SOUTHWEST QUADRANT	2500 KIPLING	H.L. & P. CO. DRILLED INTO A SEWER MAIN.	BUFFALO BAYOU	492-U	TX0034924	18-Aug-97	19:15	190	Gallons
NORTHWEST QUADRANT	114 STONEY CREEK DRIVE	MANHOLE OVERFLOWED DUE TO STOPPAGE IN THE LINE.	BUFFALO BAYOU	490-N	TX0096172	19-Aug-97	12:57	84	Gallons
WASTEWATER OPERATION	1700 WHITE OAK DR.	BREAK IN FORCE MAIN	BUFFALO BAYOU	493-A	TX0096172	02-Sep-97	06:00	500	GALS.
SOUTHWEST QUADRANT	120 GESSNER DR.	JIMMERSON CONTRACTORS DUMPING DIRT ON THE STREET	BUFFALO BAYOU	490-J	TX0063002	08-Sep-97	10:00	50	GALS
SOUTHEAST QUADRANT	3700 TUAM	STOPPAGE IN A 6" X 8" SEWER MAIN.	BUFFALO BAYOU	493-Z	TX0105058	10-Sep-97	13:20	390	Gallons
WASTEWATER OPERATION	1235 KIRKWOOD DRIVE	H.L. & P. POWER FAILURE CAUSED POWER OUTAGE AT P.S	BUFFALO BAYOU	489-J	TX0035017	23-Sep-97	09:00	30000	Gallons
WASTEWATER OPERATION	10810 CRANBROOK	HEAVY RAINFALL AND POWER FAILURE IN THE AREA.	BUFFALO BAYOU	489-L	TX0063002	09-Oct-97	13:00	20000	Gallons
WASTEWATER OPERATION	7700 WOODWAY	HYDRAULIC OVERLOAD DUE TO HEAVY RAINFALL.	BUFFALO BAYOU	490-R	TX0088159	11-Oct-97	15:00	459630	Gallons
WASTEWATER OPERATION	7700 WOODWAY	PUMPS FAILED DUE TO BLOWN FUSES.	BUFFALO BAYOU	490-R	TX0063002	12-Oct-97	12:00	29000	Gallons
WASTEWATER OPERATION	698 LOCKWOOD	HEAVY RAIN FALL AND LIFT PUMPS TRIPED.	BUFFALO BAYOU	494-Q	TX0096172	12-Oct-97	00:00	30000	Gallons
WASTEWATER OPERATION	10810 CRANBROOK	HYDRAULIC OVERLOAD DUE TO HEAVY RAINFALL.	BUFFALO BAYOU	498-L	TX0063002	13-Oct-97	04:00	29000	Gallons
NORTHEAST QUADRANT	401 S. 72 STREET	BROKEN SIX INCH SEWER MAIN STOPPED-UP & OVERFLOWED	BUFFALO BAYOU	494-X	TX0096172	29-Oct-97	14:04	8826	Gallons

Problem	Location	Description	Receiving stream	Key map	Permit	Date	Time	Volume	Unit
SOUTHWEST QUADRANT	100 SUGARBERRY	PUMPS AT HUDSON COURT WERE OFF CAUSING OVERFLOW.	BUFFALO BAYOU	490-P	TX0088153	06-Nov-97	00:30	3000	Gallons
SOUTHEAST QUADRANT	5646 NAVIGATION	STOPPAGE IN THE SEWER MAIN CAUSED OVERFLOW FROM.	BUFFALO BAYOU	494-Q	TX0096172	13-Nov-97	10:27	4050	Gallons
SOUTHEAST QUADRANT	3800 LEELAND	15" X 20" SEWER MAIN STOPPED UP CAUSING OVERFLOW.	BUFFALO BAYOU	494-S	TX0096172	13-Nov-97	14:00	200	GPM
SOUTHEAST QUADRANT	403 COWLING	STOPPAGE IN THE SEWER MAIN CAUSING OVERLOAD.	BUFFALO BAYOU	493-U	TX0096172	24-Nov-97	16:43	527	GAL.
NORTHEAST QUADRANT	4200 DALLAS AT SIDNEY STREET	SEWER MAIN STOPPED-UP CAUSING OVERLOAD.	BUFFALO BAYOU	494-S	TX0096172	24-Nov-97	12:00	38	GAL
SOUTHEAST QUADRANT	4445 MCKINNEY	ROUTINE STOPPAGE IN SEWER MAIN.	BUFFALO BAYOU	494-T	TX0096172	26-Dec-97	11:25	190	Gallons
NORTHWEST QUADRANT	415 W. GRAY	SEWER LINE WAS SET UP FOR BY PASS PUMPING DRIVER.	BUFFALO BAYOU	493-N	TX0096172	30-Dec-97	09:25	15	Gallons
SOUTHEAST QUADRANT	5646 NAVIGATION	MAIN LINE STOPPED UP.	BUFFALO BAYOU	494-Q	TX0096172	09-Jan-98	09:51	756	Gallons
SOUTHEAST QUADRANT	2400 NAVIGATION	SEWER MAIN STOPPED UP.	BUFFALO BAYOU	494-J	TX0096172	12-Jan-98	09:15	2790	Gallons
NORTHEAST QUADRANT	4800 COLLINGSWORTH	MAIN LINE NEED REPAIR.	BUFFALO BAYOU	454-Y	TX0096172	13-Jan-98	13:19	0 4	GPM
SOUTHEAST QUADRANT	2817 ENGELKE	ROUTINE STOPPAGE.	BUFFALO BAYOU	494-N	TX0096172	21-Jan-98	12:14	3460	Gallons
NORTHWEST QUADRANT	1315 CROCKER	SEWER MAIN STOPPED UP.	BUFFALO BAYOU	493-N	TX0096172	25-Jan-98	21:35	3575	Gallons
NORTHWEST QUADRANT	3300 BUTLER	TIRE AND TUBING STOPPED UP SEWER MAIN.	BUFFALO BAYOU	498-J	TX0096172	29-Jan-98	13:10	4830	Gallons
NORTHWEST QUADRANT	3125 CRESTDALE	NORMAL STOPPAGE	BUFFALO BAYOU	450-K	TX0063011	30-Jan-98	13:27	126	Gallons
SOUTHWEST QUADRANT	1500 SCHARPE / BROADMOORE	REPAIR PND IN REAR ON SEWER LINE AT 1534.	BUFFALO BAYOU	494-X	TX0096172	30-Jan-98	12:15	550	Gallons
SOUTHEAST QUADRANT	2406 NAVIGATION BLVD.	MANHOLE OVERFLOWING DUE TO STOPPAGE IN THE LINE.	BUFFALO BAYOU	494-J	TX0096172	04-Feb-98	09:31	2030	Gallons
SOUTHEAST QUADRANT	1543 LOMBARDY	OVERFLOW FROM PRIVATE LEAK, GOING INTO STORM SEWER.	BUFFALO BAYOU	494-X	TX0096172	13-Feb-98	10:55	82	GALS
NORTHEAST QUADRANT	5600 NAVIGATION	STOPPAGE IN A SEWER MAIN CAUSING AN OVERFLOW.	BUFFALO BAYOU	494-Q	TX0096172	19-Feb-98	10:48	5456	GALS
SOUTHEAST QUADRANT	2410 STEVENS	SEWER LINE HAS STOPPAGE.	BUFFALO BAYOU	494-A	TX0096172	22-Feb-98	10:00	240	Gallons
WASTEWATER OPERATIONS	2525 S/SGT. MACARIO GARCIA	MANHOLE OVERFLOWED BY THE AUTOMATIC B/WASH FILTERS	BUFFALO BAYOU	494-R	TX0096172	22-Feb-98	02:45	5000	Gallons
NORTHEAST QUADRANT	2900 CAVALCADE	A BLOCKAGE IN SEWER MAIN CAUSING OVERFLOW.	BUFFALO BAYOU	454-Y	TX0096172	26-Feb-98	13:48	6825	Gallons
SOUTHWEST QUADRANT	110 STONEY CREEK	SEWER MAIN STOPPED UP CAUSING OVERFLOW.	BUFFALO BAYOU	490-J	TX0035017	27-Feb-98	10:48	2700	Gallons
NORTHEAST QUADRANT	5315 HARRISBURG BLVD.	CLEANOUT OVERFLOWING RAW SEWER INTO STORM SEWER.	BUFFALO BAYOU	494-T	TX0096172	27-Feb-98	13:21	45	Gallons
SOUTHEAST QUADRANT	5600 NAVIGATION	SEWER OVERFLOW FROM MANHOLE DUE TO STOPPAGE.	BUFFALO BAYOU	494-Q	TX0096172	27-Feb-98	13:50	2000	Gallons
WASTEWATER OPERATIONS	12903 IROQUOIS	PUMPS 1&2 TRIPPED OFF SUBSEQUENTLY SURCHARGE SYSTE	BUFFALO BAYOU	413-Q	TX0096172	28-Feb-98	10:00	800	Gallons
NORTHEAST QUADRANT	3900 POLK STREET	SEWER MAIN STOPPED-UP CAUSING OVERFLOW.	BUFFALO BAYOU	494-S	TX0096172	04-Mar-98	12:18	170	Gallons
SOUTHWEST QUADRANT	3619 S. SHEPHERD DR.	SEWER MAIN STOPPED-UP RESULTING TO MANHOLE.	BUFFALO BAYOU	492-Y	TX0034924	05-Mar-98	11:00	72	Gallons
SOUTHWEST QUADRANT	1700 PORTSMOUTH	SEWER MAIN STOPPEDUP AND OVERFLOWING ONTO STREET.	BUFFALO BAYOU	492-Y	TX0034924	05-Mar-98	09:35	57	Gallons
WASTEWATER OPERATIONS	2525 S/SGT. MACARIO GARCIA	MOTOR BYPASS FAILED TO OPEN RESULTING TO OVERFLOW.	BUFFALO BAYOU	494-R	TX0096172	16-Mar-98	18:00	Undeter 0 mined	
NORTHWEST QUADRANT	1833 SHARP LANE	STOPPED SEWER MAIN OVERFLOWING INTO STORM DRAIN.	BUFFALO BAYOU	492-Q	TX0096172	17-Mar-98	12:50	2550	Gallons
NORTHWEST QUADRANT	2001 FANNIN & GRAY	MAIN LINE STOPPED-UP.	BUFFALO BAYOU	493-Q	TX0096172	26-Mar-98	13:36	36	Gallons
SOUTHWEST QUADRANT	1747 PORTSMOUTH	LINE STOPPAGE.	BUFFALO BAYOU	492-Z	TX0096172	31-Mar-98	19:00	93	Gallons
SOUTHWEST QUADRANT	2900 TRAVIS @ ANITA	SEWER MAIN STOPPED UP & OVERFLOWED FROM MANHOLE.	BUFFALO BAYOU	493-T	TX0096172	17-Apr-98	14:44	80	Gallons
NORTHEAST QUADRANT	4445 MCKINNEY	LOTS OF GREASE IN MAIN LINE AT STOPPAGE.	BUFFALO BAYOU	494-T	TX0096172	02-May-98	10:35	666	Gallons
NORTHWEST QUADRANT	1421 SOUTHWICK	SEWER MAIN STOPPED-UP CAUSING OVERFLOW.	BUFFALO BAYOU	450-W	TX0096172	04-May-98	09:45	744	Gallons
SOUTHWEST QUADRANT	9767 PAGEDWOOD LANE	SEWER MAIN STOPPED-UP CAUSING OVERFLOW.	BUFFALO BAYOU	490-W	TX0098191	05-May-98	13:44	465	Gallons
NORTHWEST QUADRANT	69 SADDLEBROOK	SEWER MAIN STOPPED-UP CAUSING OVERFLOW.	BUFFALO BAYOU	491-B	TX0096172	06-May-98	09:42	740	Gallons
SOUTHWEST QUADRANT	3717 WILLOWICK	AIRCELL FAILED & PUMPS FAILED TO COME ON IN AUTO	BUFFALO BAYOU	492-H	TX0034924	14-May-98	08:00	300	Gallons
NORTHWEST QUADRANT	1306 PEDEN	SEWER MAIN STOPPED-UP CAUSING O/F AT 1306 PEDEN.	BUFFALO BAYOU	493-N	TX0096172	14-May-98	15:03	43	Gallons
NORTHWEST QUADRANT	1909 SHARP PLACE	SEWER MAIN STOPPED-UP, SURCHARGED & O/F FROM M/H.	BUFFALO BAYOU	492-Q	TX0096172	26-May-98	12:48	940	Gallons
NORTHEAST QUADRANT	2900 COMMERCE	BYPASS PUMP FAILED.	BUFFALO BAYOU	494-N	TX0096172	08-Jun-98	09:30	65500	Gallons
NORTHEAST QUADRANT	2900 COMMERCE	BLOCKAGE IN SEWER MAIN CAUSING OVERFLOW.	BUFFALO BAYOU	494-P	TX0096172	15-Jun-98	11:46	1620	Gallons
SOUTHWEST QUADRANT	2606 SOUTH SHEPHERD	ROUTINE STOPPAGE CAUSING OVERFLOW FROM A MANHOLE.	BUFFALO BAYOU	492-U	TX0096172	17-Jun-98	09:03	54	Gallons
SOUTHWEST QUADRANT	10000 CEDAR CREEK DRIVE	SEWER MAIN SURCHARGED DUE TO STOPPAGE.	BUFFALO BAYOU	490-N	TX0096172	17-Jun-98	09:51	665	Gallons
NORTHEAST QUADRANT	4330 LEELAND	SEWER MAIN STOPPED-UP AND OVERFLOWED FROM MANHOLE.	BUFFALO BAYOU	494-S	TX0096172	22-Jun-98	10:03	76	Gallons
NORTHEAST QUADRANT	2400 NAVIGATION @ ST. CHARLES	AN OLD 12" COMBINATION SEWER WAS NEVER PLUGGED.	BUFFALO BAYOU	494-N	TX0096172	02-Jul-98	09:10	2350	Gallons
NORTHEAST QUADRANT	316 EASTWOOD	BROKEN SEWER MAIN STOPPED-UP AND OVERFLOWED.	BUFFALO BAYOU	494-T	TX0096172	03-Jul-98	12:48	368	Gallons
NORTHWEST QUADRANT	14900 MEMORIAL DRIVE	SEWER MAIN STOPPED-UP CAUSING OVERFLOW.	BUFFALO BAYOU	488-G	TX0035017	04-Jul-98	10:03	1060	Gallons
NORTHEAST QUADRANT	3400 HARRISBURG @ YORK	BROKEN SEWER MAIN CAUSING LEAKAGE.	BUFFALO BAYOU	494-N	TX0096172	08-Jul-98	12:30	2880	Gallons
NORTHEAST QUADRANT	900 N. VELASCO	SEWER STOPPED-UP DUE TO A BROKEN SEWER MAIN.	BUFFALO BAYOU	494-J	TX0096172	08-Jul-98	14:43	1620	Gallons
NORTHEAST QUADRANT	5500 CAVALCADE	8" X 8" SEWER MAIN WAS STOPPED-UP WITH RAGS.	BUFFALO BAYOU	454-Y	TX0096172	15-Jul-98	11:52	2040	Gallons
NORTHEAST QUADRANT	1139 ZOE	SEWER MAIN STOPPED-UP & CAUSING OVERFLOW FROM M/H.	BUFFALO BAYOU	494-M	TX0096172	17-Jul-98	14:15	57	Gallons
NORTHEAST QUADRANT	1203 CLINTON PARK	SEWER MAIN STOPPED-UP AND OVERFLOWED.	BUFFALO BAYOU	495-V	TX0096172	13-Aug-98	18:59	76	Gallons
NORTHEAST QUADRANT	5304 JEFFERSON	STOPPAGE IN SEWER MAIN DUE TO GREASE BUILD-UP.	BUFFALO BAYOU	494-X	TX0096172	15-Aug-98	20:56	88	Gallons
NORTHEAST QUADRANT	5304 JEFFERSON	BROKEN SEWER MAIN STOPPED-UP CAUSING OVERFLOW.	BUFFALO BAYOU	494-X	TX0096172	17-Aug-98	09:44	10511	Gallons
NORTHEAST QUADRANT	4728 WALKER	SEWER MAIN STOPPED-UP CAUSING UNAVOIDABLE OVERFLOW	BUFFALO BAYOU	494-T	TX0096172	23-Aug-98	16:18	270	Gallons

Problem	Location	Description	Receiving stream	Key map	Permit	Date	Time	Volume	Unit
NORTHEAST QUADRANT	7106 SHERMAN	SEWER MAIN STOPPAGE DUE TO GREASE IN THE LINE.	BUFFALO BAYOU	494-Z	TX0096172	29-Aug-98	17:10	19	Gallons
NORTHEAST QUADRANT	500 JENKINS	BROKEN SEWER MAIN STOPPED-UP AND OVERFLOWED.	BUFFALO BAYOU	494-P	TX0096172	09-Sep-98	10:49	603	Gallons
WASTEWATER OPERATIONS	16500 PARK ROW	HYDRAULIC OVERLOAD DUE TO HEAVY RAIN.	BUFFALO BAYOU	447-Y	TX0026395	11-Sep-98		2000	Gallons
WASTEWATER OPERATIONS	2525 STAFF SGT. MARCARIO GARCI	HYDRAULIC OVERLOAD DUE TO HEAVY RAINFALL.	BUFFALO BAYOU	494-R	TX0096172	11-Sep-98	05:30		Undeter mined
NORTHWEST QUADRANT	9139 BRIAR FOREST DRIVE	ROUTINE STOPPAGE	BUFFALO BAYOU	490-P	TX0063002	13-Sep-98	17:02	498	Gallons
NORTHWEST QUADRANT	5217 LINDSEY	SEWER MAIN STOPPED UP CAUSING OVERFLOW	BUFFALO BAYOU	494-X	TX0096172	14-Sep-98	13:41	108	Gallons
NORTHWEST QUADRANT	331 SAGE	LS PUMPS WERE TURNED OFF FOR REPAIRS IN THE SERVICELINE	BUFFALO BAYOU	491-G	TX0096172	15-Sep-98	09:47	760	Gallons
NORTHWEST QUADRANT	15759 FOXGATE	SEWER MAIN STOPPED-UP CAUSING OVERFLOW FROM MANHOLE.	BUFFALO BAYOU	488-B	TX0035017	15-Sep-98	08:39	1180	GALS.
NORTHEAST QUADRANT	7702 AVENUE J	SEWER MAIN STOPPED-UP AND OVERFLOWED FROM MANHOLE.	BUFFALO BAYOU	495-S	TX0096172	18-Sep-98	10:50	558	Gallons
NORTHEAST QUADRANT	920 ALTIC	BROKEN SEWER MAIN STOPPED-UP CAUSING OVERFLOW FROM M/H.	BUFFALO BAYOU	494-T	TX0096172	02-Nov-98	11:50	740	Gallons
NORTHEAST QUADRANT	5000 SHERMAN	STOPPAGE IN THE SEWER MAIN DUE TO GREASE.	BUFFALO BAYOU	494-T	TX0096172	13-Nov-98	12:13	336	Gallons
NORTHEAST QUADRANT	542 NORTH EASTWOOD	ROUTINE SEWER LINE STOPPAGE.	BUFFALO BAYOU	494-P	TX0096172	14-Nov-98	12:30	5760	Gallons
SOUTHWEST QUADRANT	4300 W. ALABAMA @ WESTLANE	SEWER LINE STOPPED-UP.	BUFFALO BAYOU	491-V	TX0062995	03-Dec-98	12:39	2475	Gallons
NORTHEAST QUADRANT	4924 LEELAND	SEWER MAIN STOPPED-UP DUE TO GREASE IN THE LINE.	BUFFALO BAYOU	494-X	TX0096172	07-Dec-98	13:27	612	Gallons
NORTHEAST QUADRANT	412 NORTH ST.CHARLES	HYDRAULIC OVER LOAD DUE TO HEAVY RAIN FALL.	BUFFALO BAYOU	494-J	TX0096172	11-Dec-98	17:17		100 GMP
SOUTHWEST QUADRANT	6349 FAIRDALE	ROUTINE STOPPAGE.	BUFFALO BAYOU	491-W	TX0062995	17-Dec-98	09:30	120	Gallons
NORTHEAST QUADRANT	SE CORNER OF 500 LOCKWOOD.	ROUTINE STOPPAGE.	BUFFALO BAYOU	494-Q	TX0096172	31-Dec-98	14:00	1100	Gallons
WASTEWATER OPERATIONS	15726 TANYA CIRCLE	LIFT PUMPS FAILED TO COME ON DUE TO AIRCELL FAILURE	BUFFALO BAYOU	488-E	TX0035017	05-Jan-99	11:00	6050	Gallons
WASTEWATER OPERATIONS	1235 S.KIRKWOOD DR.	BAD AIR RELIEF VALVE ON THE FORSE MAIN	BUFFALO BAYOU	489-J	TX0035017	12-Jan-99	14:00	1500	GALS.
NORTHWEST QUADRANT	2248 SHADOWDALE	ROUTINE STOPPAGE.	BUFFALO BAYOU	449-R	TX0096172	15-Jan-99	15:50	2800	Gallons
NORTHEAST QUADRANT	5050 JEFFERSON	ROUTINE STOPPAGE	BUFFALO BAYOU	494-X	TX0096172	21-Jan-99	09:26	285	Gallons
SOUTHWEST QUADRANT	3000 TRAVIS AT 900 ANITA	RAW SEWAGE DISCHARGE FROM MAN HOLE DUE TO LINE STOPPAGE	BUFFALO BAYOU	493-T	TX0096172	27-Jan-99	14:30	3	Gallons
NORTHWEST QUADRANT	1370 AFTON	ROUTINE STOPPAGE - GREASE ON THE LINE.	BUFFALO BAYOU	451-Y	TX0096172	29-Jan-99	14:44	3000	Gallons
NORTHWEST QUADRANT	5095 FIELDWOOD	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO STOPPAGE.	BUFFALO BAYOU	491-Q	TX0096172	01-Feb-99	15:35	280	Gallons
NORTHEAST QUADRANT	1900 EASTWOOD STREET	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO STOPPAGE IN LIN	BUFFALO BAYOU	494-W	TX0096172	18-Feb-99	20:56	74	Gallons
SOUTHWEST QUADRANT	2339 DREXEL	PLUGGED SEWER MAIN TO ENABLE REPAIRS MAIN OVERFLOW	BUFFALO BAYOU	492-S	TX0034924	19-Feb-99	16:01	578	Gallons
NORTHWEST QUADRANT	1312 W. PIERCE	MAIN LINE STOPPED UP FROM MANHOLE	BUFFALO BAYOU	493-N	TX0096172	22-Feb-99	09:38	100	Gallons
NORTHEAST QUADRANT	321 SOUTH 72 STREET	ROUTINE STOPPAGE IN AN 8" X 8' MAIN CAUSING OVERFLOW.	BUFFALO BAYOU	494-Z	TX0096172	27-Feb-99	12:00	3810	Gallons
NORTHEAST QUADRANT	4445 MCKINNEY	STOPPAGE IN THE MAIN LINE.	BUFFALO BAYOU	494-T	TX0096172	13-Mar-99	17:44	13920	Gallons
WASTEWATER OPERATIONS	2525 S./SGT. MACARIO GARCIA	2-F REACTOR INFLUENT GATE VALVE FAILED & CAUSED OVERFLOW	BUFFALO BAYOU	494-R	TX0096172	13-Mar-99	21:35		Undeter mined
WASTEWATER OPERATIONS	133 SAGE ROAD	CREW CHECKED AND DETERMINED THAT PUMPS FAILED IN AUTO	BUFFALO BAYOU	491-G	TX0034924	17-Mar-99	12:20	500	Gallons
SOUTHWEST QUADRANT	1500 BERRING DRIVE	HYDRAULIC OVERLOAD DUE TO HEAVY RAINFALL	BUFFALO BAYOU	491-T	TX0062995	19-Mar-99	09:00	10000	Gallons
SOUTHWEST QUADRANT	2222 WEST LOOP SOUTH	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO STOPPAGE IN LIN	BUFFALO BAYOU	491-R	TX0062995	23-Mar-99	13:15	2125	Gallons
NORTHWEST QUADRANT	2100 BANCROFT DRIVE	ROUTINE STOPPAGE.	BUFFALO BAYOU	491-R	TX0096172	24-Mar-99	13:35	2300	Gallons
NORTHWEST QUADRANT	5801 VALLY FORGE	ROUTINE STOPPAGE.	BUFFALO BAYOU	491-P	TX0096172	24-Mar-99	11:20	12800	Gallons
SOUTHEAST QUADRANT	5000 PEASE	STOPPAGE IN THE MAIN LINE	BUFFALO BAYOU	494-X	TX0105058	27-Mar-99	17:20	112	Gallons
NORTHWEST QUADRANT	4300 SCOTLAND	SEWER MAIN STOPPED-UP AND CAUSED OVERFLOW.	BUFFALO BAYOU	492-M	TX0096172	07-Apr-99	08:45	710	Gallons
NORTHWEST QUADRANT	8900 CHATSWORTH DRIVE	RAW SEWAGE DISCHARGEFROM A M/H DUE TO STOPPAGE.	BUFFALO BAYOU	491-H	TX0096172	09-Apr-99	09:35	1950	Gallons
WASTEWATER OPERATIONS	15634 MEMORIAL DRIVE	PUMPS FAILED TO COME ON DUE TO POWER FAILURE TO STATION	BUFFALO BAYOU	488-B	TX0035017	12-Apr-99	08:30	7500	Gallons
NORTHWEST QUADRANT	410 EAST FAIR HARBOR	UNAVOIDABLE RAW SEWAGE DISCHARGE FROM A MAN HOLE DUE TO	BUFFALO BAYOU	488-B	TX0035017	12-Apr-99	08:30	6000	Gallons
NORTHEAST QUADRANT	909 WACO	ROUTINE STOPPAGE.	BUFFALO BAYOU	494-F	TX0096172	20-Apr-99	22:18	360	Gallons
NORTHEAST QUADRANT	500 NORTH JENKINS	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO STOPPAGE.	BUFFALO BAYOU	494-P	TX0096172	21-Apr-99	08:36	33	Gallons
NORTHWEST QUADRANT	1519 GLEN OAKS	ROUTINE STOPPAGE CAUSED BY GREASE IN THE LINE.	BUFFALO BAYOU	492-C	TX0096172	21-Apr-99	09:41	3540	Gallons
NORTHWEST QUADRANT	2222 WEST LOOP SOUTH	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO STOPPAGE IN LIN	BUFFALO BAYOU	491-R	TX0096172	21-Apr-99	10:34	1455	Gallons
NORTHWEST QUADRANT	6108 TYNE	UNAVOIDABLE RAW SEWAGE DIACHARGE DUE TO STOPPAGE.	BUFFALO BAYOU	492-G	TX0096172	22-Apr-99	11:48	680	Gallons
NORTHEAST QUADRANT	5119 NOBLE	ROUTINE LINE STOPPAGE.	BUFFALO BAYOU	494-C	TX0096172	22-Apr-99	21:30	1650	Gallons
NORTHWEST QUADRANT	133 SAGE ROAD	DISCHARGING SEWER FROM MANHOLE DUE TO AIR CELL FAILURE	BUFFALO BAYOU	491-G	TX0034924	28-Apr-99	11:56	960	Gallons
SOUTHWEST QUADRANT	14935 KIMBERLY	ROUTINE STOPPAGE.	BUFFALO BAYOU	488-G	TX0035017	30-Apr-99	16:13	570	Gallons
NORTHEAST QUADRANT	3827 LOCKWOOD	RAW SEWAGE DISCHARGE DUE TO MAIN LINE STOPPAGE	BUFFALO BAYOU	454-Y	TX0096172	04-May-99	08:58	45	Gallons
NORTHEAST QUADRANT	3001 HOUSTON AVENUE	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-C	TX0096172	05-May-99	09:29	16	Gallons
NORTHEAST QUADRANT	9200 PECOS	UNAVOIDABLE SEWAGE DISCHARGE DUE TO STOPPAGE IN MAIN	BUFFALO BAYOU	450-Y	TX0096172	06-May-99	10:44	455	Gallons
NORTHEAST QUADRANT	6314 CINDY LANE	SEWAGE DISCHARGE DUE TO STOPPAGE CAUSED BY GREASE BUILD	BUFFALO BAYOU	452-X	TX0096172	07-May-99	11:06	710	Gallons
NORTHWEST QUADRANT	900 FRAWLEY	UNAVOIDABLE SEWAGE DISCHARGE DUE TO STOPPAGE IN MAIN	WHITE OAK BAYOU	453-V	TX0057347	11-May-99	09:32	1580	Gallons
NORTHEAST QUADRANT	10 OAK COURT	SEWER MAIN WAS PLUGGED SUBSEQUENTLY SURCHARGING MAIN	BUFFALO BAYOU	493-P	TX0096172	11-May-99	11:25	1625	Gallons

Problem	Location	Description	Receiving stream	Key map	Permit	Date	Time	Volume	Unit
NORTHWEST QUADRANT	903 OMAR	SEWER MAIN STOPPED UP CAUSING OVERFLOW	BUFFALO BAYOU	493-B	TX0096172	13-May-99	07:50	366	Gallons
NORTHWEST QUADRANT	9001 KEMPWOOD DRIVE	ROUTINE STOPPAGE, CLEARED CITY MAIN	BUFFALO BAYOU	450-Q	TX0063002	17-May-99	11:06	1000	Gallons
SOUTHWEST QUADRANT.	1833 SHARP PLACE	ROUTINE STOPPAGE	BUFFALO BAYOU	492-Q	TX0096172	19-May-99	10:47	2736	Gallons
NORTHWEST QUADRANT	14562 CHADBOURNE DRIVE	RAW SEWER DISCHARGE DUE TO STOPPAGE IN MAIN LINE	BUFFALO BAYOU	489-E	TX0096172	20-May-99	11:20	1800	Gallons
WASTEWATER OPERATIONS	7909 1/2 MARKET STREET	BRAKE IN 24" FORCE MAIN FROM MARKET ST. PUMP STATION	BUFFALO BAYOU	495-F	TX0096172	21-May-99	11:00	10000	Gallons
NORTHEAST QUADRANT	204 NORTH NAGLE	SEWER OVERFLOW FROM A MAIN DUE TO STOPPAGE BY GREASE	BUFFALO BAYOU	494-N	TX0096172	21-May-99	16:05	480	Gallons.
NORTHWEST QUADRANT	1308 NORTHWOOD	SEWER MAIN STOPPED UP CAUSING OVERFLOW	BUFFALO BAYOU	453-T	TX0096172	21-May-99	08:31	1250	Gallons.
NORTHWEST QUADRANT	2300 CENTER	STOPPAGE IN 8" X 8" SEWER MAIN CAUSED RAW SEWER OVERFLO	BUFFALO BAYOU	483-F	TX0096172	24-May-99	09:02	2395	Gallons
SOUTHEAST QUADRANT	1224 N. POST OAK RD.	ROUTINE STOPPAGE	BUFFALO BAYOU	491-D	TX0096172	27-May-99	10:00	625	Gallons
NORTHWEST QUADRANT	215 FARGO	UNAVOIDABLE SEWER DISCHARGE DUE TO STOPPAGE IN MAIN	BUFFALO BAYOU	493-P	TX0096172	01-Jun-99	07:25	172	Gallons
NORTHWEST QUADRANT	10731 LONGMONT	CONTRACTOR BROKE AND STOPPED-UP SEWER CAUSING OVERFLOW.	BUFFALO BAYOU	489-Q	TX0088153	04-Jun-99	09:30	1356	Gallons
NORTHEAST QUADRANT	1426 LAWSON	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO STOPPAGE.	BUFFALO BAYOU	494-X	TX0096172	08-Jun-99	11:31	83	Gallons
NORTHWEST QUADRANT	500 SAN JACINTO	UNAVOIDABLE RAW SEWER OVERFLOE DUE TO STOPPAGE.	BUFFALO BAYOU	493-L	TX0096172	10-Jun-99	08:18	74	Gallons
NORTHWEST QUADRANT	1307 WELCH	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO STOPPAGE IN LIN	BUFFALO BAYOU	493-N	TX0096172	11-Jun-99	08:02	194	Gallons
SOUTHWEST QUADRANT	7900 WESTHEIMER	ROUTINE STOPPAGE.	BUFFALO BAYOU	490-V	TX0035017	13-Jun-99	15:50	330	Gallons
NORTHWEST QUADRANT	1307 WELCH	UNAVOIDABLE RAWSEWAGE DISCHARGE CAUSED BY A BROKEN MAIN	BUFFALO BAYOU	493-N	TX0096172	18-Jun-99	09:11	458	Gallons
NORTHWEST QUADRANT	777 BATESWOOD	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO MAIN STOPPAGE.	BUFFALO BAYOU	489-E	TX0096172	18-Jun-99	12:10	1416	Gallons
SOUTHEAST QUADRANT	4502 SHARON	ROUTINE STOPPAGE.	BUFFALO BAYOU	494-F	TX0096172	21-Jun-99	15:31	74	Gallons
NORTHEAST QUADRANT	2417 WAYNE	BROKEN SEWER MAIN CAUSING UNAVOIDABLE SEWAGE DISCHARGE.	BUFFALO BAYOU	494-B	TX0096172	22-Jun-99	09:-5	9735	Gallons
NORTHWEST QUADRANT	14606 BROADGREEN	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO STOPPAGE IN MAI	BUFFALO BAYOU	489-E	TX0096172	24-Jun-99	11:10	800	Gallons
NORTHWEST QUADRANT	3939 SAN FELIPE	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO STOPPAGE IN MAI	BUFFALO BAYOU	492-N	TX0034924	25-Jun-99	08:33	570	Gallons
NORTHWEST QUADRANT	915 WEST CAVALCADE	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO STOPPAGE.	BUFFALO BAYOU	453-T	TX0096172	29-Jun-99	11:58	4320	Gallons
SOUTHWEST QUADRANT	12000 ASHFORD PARK	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO STOPPAGE IN MAI	BUFFALO BAYOU	489-S	TX0035017	30-Jun-99	13:50	207	Gallons
NORTHEAST QUADRANT	2000 COLLIER AT MULFORD	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO STOPPAGE.	BUFFALO BAYOU	494-X	TX0096172	01-Jul-99	10:58	54	Gallons
WASTEWATER OPERATIONS	2500 KIRBY DRIVE	BROKEN FORCE MAIN AT 2500 KIRBY @ SANSABA.	BUFFALO BAYOU	492-Q	TX0062995	08-Jul-99	15:00	6000	Gallons
SOUTHWEST QUADRANT	7531 WESTHEIMER	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO STOPPAGE.	BUFFALO BAYOU	490-V	TX0035017	09-Jul-99	01:56	2532	Gallons
NORTHWEST QUADRANT	10612 HEMPSTEAD	UNAVOIDABLE DISCHARGE DUE TO STOPPAGE.	BUFFALO BAYOU	457-U	TX0096172	09-Jul-99	10:36	1280	Gallons
NORTHEAST QUADRANT	4530 WALKER	SEWER MAIN STOPPED-UP CAUSING RAW SEWAGE DISCHARGE.	BUFFALO BAYOU	494-T	TX0096172	14-Jul-99	19:06	4770	Gallons
NORTHWEST QUADRANT	848 YALE	8" SEWER MAIN STOPPED-UP CAUSING RAW SEWAGE DISCHARGE.	BUFFALO BAYOU	492-D	TX0096172	16-Jul-99	06:30	420	Gallons
NORTHWEST QUADRANT	504 SAN JACINTO @ TEXAS	STOPPAGE DUE TO BROKEN SEWER MAIN.	BUFFALO BAYOU	493-L	TX0096172	20-Jul-99	13:00	1715	Gallons
SOUTHWEST QUADRANT	600 WILCREST	STOPPAGE IN 8" X 11" SEWER MAIN.	BUFFALO BAYOU	489-K	TX0088153	22-Jul-99	08:15	990	Gallons
NORTHWEST QUADRANT	700 JEWETT STREET	ROUTINE STOPPAGE.	BUFFALO BAYOU	453-X	TX0096172	26-Jul-99	12:57	1070	Gallons
NORTHEAST QUADRANT	6018 CANAL	ROUTINE STOPPAGE.	BUFFALO BAYOU	494-U	TX0096172	27-Jul-99	10:45	125	Gallons
NORTHEAST QUADRANT	504 SAN JACINTO @ 1117 TEXAS	ROUTINE STOPPAGE IN SERVICE LINE.	BUFFALO BAYOU	493-L	TX0096172	04-Aug-99	16:49	4600	Gallons
NORTHEAST QUADRANT	3003 CHARTER OAKS	ROUTINE STOPPAGE.	BUFFALO BAYOU	414-S	TX0096172	06-Aug-99	23:04	5080	Gallons
SOUTHWEST QUADRANT	2222 WEST LOOP FREEWAY	ROUTINE STOPPAGE.	BUFFALO BAYOU	491-V	TX0062995	10-Aug-99	10:57	4240	Gallons
NORTHWEST QUADRANT	516 HYDE PARK @ HOSPKINS	ROUTINE STOPPAGE	BUFFALO BAYOU	493-N	TX0096172	16-Aug-99	10:15	1640	Gallons
NORTHWEST QUADRANT	10719 CANDLEWOOD @ WALNUT BEND	BROKEN SEWER MAIN STOPPED-UP AND CAUSING OVERFLOW.	BUFFALO BAYOU	489-Q	TX0088153	18-Aug-99	16:56	12660	Gallons
WASTEWATER OPERATIONS	2525 S/SGT MACARIO GARCIA	UNCHLORINATED EFFLUENT DISCHARGE INTO BAYOU DUE TO2BMOV	BUFFALO BAYOU	494-R	TX0096172	26-Aug-99	15:45	10000	Gallons
NORTHWEST QUADRANT	12555 BRIAFORST	ROUTINE STOPPAGE.	BUFFALO BAYOU	488-R	TX0035017	27-Aug-99	08:24	940	Gallons
NORTHEAST QUADRANT	3100 LEGION/BREWSTER	8"x8" SEWER MAIN STOPPED-UP DUE TO BREAKAGE.	BUFFALO BAYOU	454-W	TX0096172	27-Aug-99	11:01	145	Gallons
NORTHEAST QUADRANT	4330 LEELAND	SEWER MAIN STOPPED-UP.	BUFFALO BAYOU	494-S	TX0096172	28-Aug-99	16:25	900	Gallons
NORTHEAST QUADRANT	1200 SYDNEY	MAIN LINE STOPPED-UP.	BUFFALO BAYOU	494-S	TX0096172	30-Aug-99	11:15	41	Gallons
SOUTHEAST QUADRANT	2819 BERRY	ROUTINE STOPPAGE.	BUFFALO BAYOU	493-Y	TX0096172	30-Aug-99	17:51	2200	Gallons
NORTHEAST QUADRANT	4222 WEAVER	STOPPAGE IN THE MAIN LINE.	BUFFALO BAYOU	454-L	TX0096172	03-Sep-99	14:02	755	Gallons
NORTHWEST QUADRANT	9800 PAGWOOD LANE	ROUTINE STOPPAGE	BUFFALO BAYOU	490-W	TX0063002	05-Sep-99	09:55	1625	Gallons
NORTHEAST QUADRANT	934 HALO	ROUTINE STOPPAGE.	BUFFALO BAYOU	494-H	TX0096172	05-Sep-99	17:36	288	Gallons
NORTHEAST QUADRANT	4426 LEELAND	BROKEN SEWER MAIN CAUSING OVERFLOW.	BUFFALO BAYOU	494-S	TX0096172	05-Sep-99	09:33	848	Gallons
NORTHEAST QUADRANT	7505 NAVIGATION	SEWER MAIN STOPPED-UP.	BUFFALO BAYOU	495-S	TX0096172	06-Sep-99	09:04	71	Gallons
NORTHEAST QUADRANT	4120 WALKER	SEWER MAIN STOPPED-UP.	BUFFALO BAYOU	495-S	TX0096172	07-Sep-99	10:30	45	Gallons
NORTHWEST QUADRANT	6419 WESTCOTT	MAIN LINE HAD STOPPAGE.	BUFFALO BAYOU	492-G	TX0096172	08-Sep-99	13:34	1520	Gallons
SOUTHEAST QUADRANT	714 NORTH EASTWOOD	ROUTINE STOPPAGE.	BUFFALO BAYOU	494-P	TX0096172	09-Sep-99	18:50	114	Gallons
NORTHEAST QUADRANT	7128 AVENUE K	MAIN LINE STOPPED-UP.	BUFFALO BAYOU	494-X	TX0096172	09-Sep-99	09:40	82	Gallons
SOUTHWEST QUADRANT	2100 BANCROFT	STOPPAGE IN THE MAIN LINE.	BUFFALO BAYOU	491-V	TX0096172	10-Sep-99	11:35	6110	Gallons
NORTHWEST QUADRANT	1700 VAN BUREN	SEWER MAIN STOPPED-UP.	BUFFALO BAYOU	493-N	TX0096172	14-Sep-99	08:25	490	Gallons
NORTHWEST QUADRANT	2600 ALBANY @ McGOWAN	SEWER MAIN STOPPED-UP.	BUFFALO BAYOU	493-P	TX0096172	14-Sep-99	07:36	2420	Gallons
NORTHEAST QUADRANT	4516 CANAL	SEWER MAIN STOPPED-UP.	BUFFALO BAYOU	494-P	TX0096172	14-Sep-99	09:00	675	Gallons
NORTHEAST QUADRANT	2117 EVERETT	ROUTINE STOPPAGE.	BUFFALO BAYOU	493-C	TX0096172	14-Sep-99	16:40	355	Gallons
NORTHEAST QUADRANT	6002 HARRISBURG	ROUTINE STOPPAGE.	BUFFALO BAYOU	494-U	TX0096172	14-Sep-99	19:17	24	Gallons
SOUTHEAST QUADRANT	112 NAGLE	STOPPAGE IN THE MAIN LINE.	BUFFALO BAYOU	494-N	TX0096172	16-Sep-99	16:49	100	Gallons
NORTHEAST QUADRANT	6526 CANAL	ROUTINE STOPPAGE.	BUFFALO BAYOU	494-U	TX0096172	17-Sep-99	17:02	110	Gallons

Problem	Location	Description	Receiving stream	Key map	Permit	Date	Time	Volume	Unit
NORTHEAST QUADRANT	3713 JENSEN	ROUTINE STOPPAGE.	BUFFALO BAYOU	454-W	TX0096172	17-Sep-99	14:18	680	Gallons
NORTHWEST QUADRANT	3000 HOUSTON	ROUTINE STOPPAGE.	BUFFALO BAYOU	493-C	TX0096172	18-Sep-99	08:10	1990	Gallons
NORTHWEST QUADRANT	810 10th W.	ROUTINE STOPPAGE.	BUFFALO BAYOU	492-D	TX0096172	18-Sep-99	12:00	1370	Gallons
SOUTHWEST QUADRANT	2101 CITYWEST BLVD.	SEWER MAIN STOPPED-UP DUE TO GREASE BUILD-UP.	BUFFALO BAYOU	489-U	TX0035017	21-Sep-99	09:45	150	Gallons
NORTHWEST QUADRANT	15885 MEMORIAL	ROUTINE STOPPAGE.	BUFFALO BAYOU	488-E	TX0035017	21-Sep-99	08:17	566	Gallons
NORTHEAST QUADRANT	4604 EAST FREEWAY	SEWER MAIN STOPPED-UP.	BUFFALO BAYOU	494-F	TX0096172	24-Sep-99	13:22	16	Gallons
NORTHEAST QUADRANT	710 SWITZER	MAIN LINE STOPPED-UP.	BUFFALO BAYOU	495-H	TX0096172	24-Sep-99	16:13	610	Gallons
NORTHWEST QUADRANT	812 SABINE	ROUTINE STOPPAGE IN LINE.	BUFFALO BAYOU	493-K	TX0096172	26-Sep-99	10:51	135	Gallons
NORTHWEST QUADRANT	5626 TERIWILLIGER DRIVE	SEWER MAIN STOPPED-UP.	BUFFALO BAYOU	491-P	TX0062995	27-Sep-99	13:31	1677	Gallons
NORTHEAST QUADRANT	1420 LAWSON	MAIN LINE STOPPED-UP.	BUFFALO BAYOU	494-X	TX0096172	29-Sep-99	11:20	70	Gallons
SOUTHWEST QUADRANT	1310 SOUTH POST OAK LANE	CONTRACTOR BROKE SEWER MAIN.	BUFFALO BAYOU	491-Q	TX0062995	02-Oct-99	12:16	300	Gallons
NORTHWEST QUADRANT	7947 KATY FREEWAY	STOPPAGE IN A LATERAL LINE.	BUFFALO BAYOU	491-B	TX0096172	06-Oct-99	10:20	875	Gallons
NORTHWEST QUADRANT	2110 BROOKTREE DRIVE	STOPPAGE IN MAIN LINE.	BUFFALO BAYOU	452-S	TX0096172	08-Oct-99	14:12	618	Gallons
NORTHWEST QUADRANT	2110 BROOKTREE DRIVE	MAIN STOPPAGE.	BUFFALO BAYOU	452-J	TX0096172	09-Oct-99	18:23	1235	Gallons
NORTHWEST QUADRANT	3800 BRILEY	ROUTINE STOPPAGE.	BUFFALO BAYOU	415-Y	TX0096172	10-Oct-99	09:30	285	Gallons
NORTHEAST QUADRANT	4219 WOODLEIGH @ SIDNEY	SEWER MAIN STOPPED-UP.	BUFFALO BAYOU	494-S	TX0096172	11-Oct-99	09:53	168	Gallons
NORTHEAST QUADRANT	4445 McKINNEY	SEWER MAIN STOPPED-UP.	BUFFALO BAYOU	494-T	TX0096172	11-Oct-99	10:15	446	Gallons
NORTHWEST QUADRANT	14362 CHADBOURNE DRIVE	ROUTINE STOPPAGE.	BUFFALO BAYOU	488-H	TX0035017	15-Oct-99	09:40	1170	Gallons
NORTHWEST QUADRANT	1950 SPENWICK DRIVE	MAIN LINE OVERFLOW DUE TO STOPPAGE.	BUFFALO BAYOU	451-S	TX0096172	16-Oct-99	18:55	600	Gallons
NORTHWEST QUADRANT	10027 WESTVIEW DRIVE.	MAIN LINE STOPPED-UP.	BUFFALO BAYOU	450-W	TX0096172	16-Oct-99	14:07	1896	Gallons
NORTHEAST QUADRANT	117 CAVALCADE	ROUTINE STOPPAGE IN THE MAIN LINE.	BUFFALO BAYOU	453-U	TX0096172	18-Oct-99	15:20	140	Gallons
SOUTHWEST QUADRANT	14222 CHADBOURNE	ROUTINE STOPPAGE IN SEWER MAIN.	BUFFALO BAYOU	489-E	TX0035017	19-Oct-99	09:43	2790	Gallons
NORTHEAST QUADRANT	1500 MAIN AT BROOK	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-G	TX0096172	20-Oct-99	03:24	302	Gallons
NORTHEAST QUADRANT	218 MOODY	ROUTINE STOPPAGE.	BUFFALO BAYOU	453-U	TX0096172	22-Oct-99	19:34	121	Gallons
SOUTHWEST QUADRANT	600 NOTTINGHAM OAKS TRAIL	ROUTINE STOPPAGE FROM MAIN LINE	BUFFALO BAYOU	488-G	TX0035017	22-Oct-99	12:19	480	Gallons
SOUTHWEST QUADRANT	1143 KATY FREEWAY	ROUTINE STOPPAGE	BUFFALO BAYOU	489-A	TX0096172	25-Oct-99	15:10	300	Gallons
SOUTHWEST QUADRANT	527 ELECTRA	ROUTINE STOPPAGE	BUFFALO BAYOU	489-G	TX0035017	26-Oct-99	07:50	1375	Gallons
Northeast QUADRANT(713)	2906 Lavender	Routine Stoppage From Main Line.	Buffalo Bayou	494-C	TX0096172	27-Oct-99	18:12	212	Gallons
Northwest Quadrant	317 W. 6th Street	Routine Stoppage in Line.	Buffalo Bayou	492-D	TX0096172	27-Oct-99	15:10	2920	Gallons
Southeast Quadrant	321 Baldinger	Routine Stoppage In Main Line.	Buffalo Bayou	494-Z	TX0096172	27-Oct-99	18:40	1098	Gallons
SOUTHWEST QUADRANT	1600 POST OAK	ROUTINE STOPPAGE	BUFFALO BAYOU	411-Q	TX0062995	01-Nov-99	15:21	860	Gallons
NORTHEAST QUADRANT	7320 DALLAS	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-Z	TX0096172	04-Nov-99	12:11	82.5	Gallons
SOUTHWEST QUADRANT	1010 ROSINE	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-M	TX0096172	04-Nov-99	13:34	340	Gallons
SOUTHEAST QUADRANT	611 SAMPSON	ROUTINE STOPPAGE	BUFFALO BAYOU	494-N	TX0096172	05-Nov-99	15:26	27	Gallons
NORTHWEST QUADRANT	5711 YALE	ROUTINE STOPPAGE	BUFFALO BAYOU	452-O	TX0096172	05-Nov-99	13:55	1200	Gallons
NORTHEAST QUADRANT	13405 EAST FREEWAY	ROUTINE STOPPAGE	BUFFALO BAYOU	497-L	TX0096172	06-Nov-99	13:06	134	Gallons
NORTHEAST QUADRANT	2814 TEDDY	ROUTINE STOPPAGE	BUFFALO BAYOU	493-D	TX0096172	08-Nov-99	19:19	59	Gallons
NORTHWEST QUADRANT	1506 MAUX	ROUTINE STOPPAGE	BUFFALO BAYOU	450-W	TX0096172	09-Nov-99	13:40	204	Gallons
NORTHEAST QUADRANT	1742WOODVINE	BREAK IN MAIN LINE	BUFFALO BAYOU	451-T	TX0096172	09-Nov-99	08:45	580	Gallons
NORTHWEST QUADRANT	9601 KEMPWOOD	ROUTINE STOPPAGE	BUFFALO BAYOU	450-K	TX0063011	10-Nov-99	11:27	185	Gallons
NORTHEAST QUADRANT	1120 TEXAS	ROUTINE STOPPAGE	BUFFALO BAYOU	415-R	TX0096172	10-Nov-99	09:30	552	Gallons
NORTHEAST QUADRANT	317 72nd STREET	MAIN LINE STOPPED UP.	BUFFALO BAYOU	494-Z	TX0096172	11-Nov-99	09:30	620	Gallons
NORTHWEST QUADRANT	10023 LARSTON	ROUTINE STOPPAGE	BUFFALO BAYOU	450-W	TX0063002	14-Nov-99	09:55	245	Gallons
NORTHWEST QUADRANT	W-34TH/NORTHWEST FREEWAY #2498	ROUTINE MAIN STOPPAGE	69TH STREET W.T.P	401-Q	TX0057327	16-Nov-99	13:20	1790	Gallons
NORTHWEST QUADRANT	5506 RUSSETT	ROUTINE STOPPAGE	BUFFALO BAYOU	491-K	TX0063002	17-Nov-99	08:16	730	Gallons
NORTHEAST QUADRANT	505 BERING	ROUTINE STOPPAGE	BUFFALO BAYOU	491-K	TX0096172	17-Nov-99	10:38	4340	Gallons
NORTHEAST QUADRANT	8001 FULTON	MAIN LINE STOPPED UP.	BUFFALO BAYOU	453-K	TX0096172	17-Nov-99	14:10	420	Gallons
N/A	1500 BERING DR.	HYDRAULIC OVERLOAD DUE TO PELTIER CONSTRUCTION	BUFFALO BAYOU	491-T	TX0062995	18-Nov-99	08:30	500	Gallons
NORTHEAST QUADRANT	100 GLENDON	MAIN LINE STOPPED UP.	BUFFALO BAYOU	495-W	TX0096172	18-Nov-99	08:13	240	Gallons
NORTHEAST QUADRANT	11817 FLEMING	ROUTINE STOPPAGE	BUFFALO BAYOU	496-F	TX0096172	20-Nov-99	16:36	556	Gallons
NORTHEAST QUADRANT	902 RIDONDO	ROUTINE STOPPAGE	BUFFALO BAYOU	496-H	TX0096172	20-Nov-99	18:26	80	Gallons
NORTHWEST QUADRANT	7209 DANE	ROUTINE STOPPAGE	BUFFALO BAYOU	454-J	TX0096172	21-Nov-99	18:31	116	Gallons
NORTHEAST QUADRANT	1900 YORKTOWN	ROUTINE STOPPAGE	BUFFALO BAYOU	491-Q	TX0096172	22-Nov-99	13:09	1274	Gallons
NORTHEAST QUADRANT	5210 LIVE OAK	MAIN LINE STOPPED UP	BUFFALO BAYOU	533-B	TX0096172	27-Nov-99	16:10	10860	Gallons
SOUTHWEST QUADRANT	13814 BRITOAK	ROUTINE STOPPAGE	BUFFALO BAYOU	489-A	TX0096172	28-Nov-99	10:04	2192	Gallons
N/A	900 N. YORK	BROKEN 24" FORCE MAIN (BELONGS TO PROCESS OPERATIONS)	BUFFALO BAYOU	494-P	TX0096172	29-Nov-99	15:49	1390	Gallons
NORTHEAST QUADRANT	8811 MANUS	ROUTINE STOPPAGE	BUFFALO BAYOU	454-E	TX0096172	29-Nov-99	20:00	810	Gallons
N/A	900 N. YORK	FORCE MAIN TO LS BROKEN	BUFFALO BAYOU	494-P	TX0096172	30-Nov-99	08:00	500	Gallons
NORTH EAST QUADRANT	1554 ELLIOTT	ROUTINE STOPPAGE	BUFFALO BAYOU	494-X	TX0096172	01-Dec-99	19:44	155	Gallons
NORTHEAST QUADRANT	4707 GULF FREEWAY	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-W	TX0096172	01-Dec-99	13:24	41	Gallons
WEST DISTRICT	1144 KATY FRWY	ROUTINE STOPPAGE	BUFFALO BAYOU	489-A	TX0063002	02-Dec-99	10:11	275	Gallons
WEST DISTRICT	855 GESSNER	ROUTINE STOPPAGE	BUFFALO BAYOU	490-E	TX0063002	02-Dec-99	11:42	3110	Gallons
SOUTHWEST QUADRANT	971 KIRBY DR.	ROUTINE STOPPAGE	BUFFALO BAYOU	492-L	TX0096172	02-Dec-99	11:45	1365	Gallons
NORTHEAST QUADRANT	1200 SIDNEY	MAIN LINE STOPPED UP.	BUFFALO BAYOU	494-S	TX0096172	03-Dec-99	09:06	670	Gallons
N/A	698 LOCKWOOD	AIR CELL FAILURE,WET WELL OVERFLOW	BUFFALO BAYOU	494-Q	TX0096172	03-Dec-99	07:00	5000	Gallons
NORTHEAST QUADRANT	5112 LELIA ST.	MAIN LINE STOPPAGE	BUFFALO BAYOU	494-C	TX0096172	04-Dec-99	10:52	35	Gallons
NORTHWEST QUADRANT	4010 ROTMAN	ROUTINE STOPPAGE	BUFFALO BAYOU	494-P	TX0096172	04-Dec-99	13:12	34	Gallons
NORTHWEST QUADRANT	730 ANTOINE	ROUTINE LINE STOPPAGE	BUFFALO BAYOU	491-B	TX0063011	06-Dec-99	13:00	215	Gallons
SOUTHWEST QUADRANT	999 S. POST OAK LANE.	ROUTINE STOPPAGE	BUFFALO BAYOU	491-Z	TX0096172	06-Dec-99	08:22	576	Gallons
NORTHWEST QUADRANT.	5049 JEFFERSON	ROUTINE STOPPAGE	BUFFALO BAYOU	494-W	TX0096172	08-Dec-99	13:10	109	Gallons
SOUTHWEST QUADRANT	777 N. POST OAK RD.	ROUTINE STOPPAGE	BUFFALO BAYOU	489-L	TX0063002	09-Dec-99	09:25	1130	Gallons
NORTHWEST QUADRANT	1 BRIAR TRAIL	ROUTINE LINE STOPPAGE	BUFFALO BAYOU	491-G	TX0063011	10-Dec-99	08:30	2020	Gallons
NORTHEAST QUADRANT	9928 EDGEWORTH	MAIN LINE STOPPAGE	BUFFALO BAYOU	454-A	TX0063053	10-Dec-99	12:01	455	Gallons
SOUTHEAST QUADRANT	3335 WAYSIDE	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-Z	TX0096172	10-Dec-99	11:40	675	Gallons
NORTH EAST T.P.	3260 TRUXILLO	ROUTINE STOPPAGE	BUFFALO BAYOU	493-Y	TX0096172	13-Dec-99	16:41	372	Gallons
NORTHWEST QUADRANT	5095 FIELDWOOD	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-Q	TX0096172	13-Dec-99	10:10	441	Gallons
NORTHEAST QUADRANT	1200 CAMPBELL	MIAN LINE STOPPED UP	BUFFALO BAYOU	493-D	TX0096172	14-Dec-99	08:10	129	Gallons
NORTHEAST QUADRANT.	103 EASTGATE	ROUTINE STOPPAGE	BUFFALO BAYOU	495-W	TX0096172	14-Dec-99	15:00	30	Gallons
NORTHWEST QUADRANT	1833 JOHANNA	ROUTINE LINE STOPPAGE	BUFFALO BAYOU	451-T	TX0063061	15-Dec-99	11:15	290	Gallons
SOUTHEAST QUADRANT	7319 DALLAS	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-Z	TX0096172	15-Dec-99	11:00	118	Gallons
NORTHEAST QUADRANT	3713 JENSEN	MAIN LINE STOPPED UP	BUFFALO BAYOU	454-W	TX0096172	15-Dec-99	10:00	366	Gallons

Problem	Location	Description	Receiving stream	Key map	Permit	Date	Time	Volume	Unit
NORTHWEST QUADRANT	10526 ROCK CREST	MAIN LINE STOPPAGE	BUFFALO BAYOU	450-E	TX0063002	17-Dec-99	10:39	1300	Gallons
NORTHEAST QUADRANT	7401 KATY FREEWAY	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-C	TX0096172	17-Dec-99	08:27	450	Gallons
SOUTHEAST QUADRANT	4803 MCKINNY	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-T	TX0096172	17-Dec-99	09:55	206	Gallons
NORTHEAST QUADRANT	6902 PALESTINE	SERVICE LINE STOPPAGE	BUFFALO BAYOU	495-E	TX0096172	17-Dec-99	09:41	1125	Gallons
SOUTHEAST QUADRANT	100 TELEPHONE RD.	MAIN LINE STOPPED UP	BUFFALO BAYOU	495-S	TX0096172	17-Dec-99	11:45	30	Gallons
SOUTHEAST QUADRANT	6009 BRANDY	ROUTINE STOPPAGE	BUFFALO BAYOU	494-U	TX0096172	17-Dec-99	16:47	240	Gallons
SOUTHEAST QUADRANT	6013 BRANDY	ROUTINE STOPPAGE	BUFFALO BAYOU	494-U	TX0096172	17-Dec-99	16:49	240	Gallons
SOUTHEAST QUADRANT	103 BEDFORTH	MAIN LINE STOPPED UP	BUFFALO BAYOU	495-W	TX0096172	17-Dec-99	11:37	158	Gallons
SOUTHWEST QUADRANT	1836 AUGUSTA DRIVE	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-P	TX0096172	18-Dec-99	10:00	465	Gallons
NORTHEAST QUADRANT	3907 RUSK	ROUTINE STOPPAGE	BUFFALO BAYOU	494-S	TX0096172	18-Dec-99	17:25	156	Gallons
SOUTHWEST QUADRANT	2100 YUPON	ROUTINE STOPPAGE	BUFFALO BAYOU	492-R	TX0096172	19-Dec-99	09:42	54	Gallons
SOUTHEAST QUADRANT	904 W. SCOTT	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-G	TX0096172	19-Dec-99	12:46	310	Gallons
NORTHWEST	11902 KEMPHOLLOW LN.	MAIN LINE STOPPED UP	BUFFALO BAYOU	449-L	TX0035017	20-Dec-99	14:30	2700	Gallons
NORTHEAST QUADRANT.	2928 BRACKENRIDGE	ROUTINE STOPPAGE	BUFFALO BAYOU	494-A	TX0096172	21-Dec-99	15:43	60	Gallons
SOUTHWEST QUADRANT	5200 WOOD HEAD	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-Z	TX0096172	21-Dec-99	17:08	2024	Gallons
NORTHWEST QUADRANT	6014 INWOOD	ROUTINE STOPPAGE	BUFFALO BAYOU	491-N	TX0063011	22-Dec-99	08:24	2751	Gallons
NORTHEAST QUADRANT	12601 ADELIA	ROUTINE STOPPAGE	BUFFALO BAYOU	494-A	TX0096172	22-Dec-99	15:23	112.5	Gallons
N/A	2525 MACARIO GARCIA	LOSS OF INSTRUMENT AIR PRESSURE TO WASTING STATION	BUFFALO BAYOU	494-R	TX0096172	22-Dec-99	21:30	350	Gallons
NORTHWEST QUADRANT	9628 HAMMERLY	MAIN LINE STOPPAGE	BUFFALO BAYOU	450-P	TX0063002	23-Dec-99	10:36	1615	Gallons
SOUTHEAST QUADRANT	2900 WICHITA	ROUTINE STOPPAGE	BUFFALO BAYOU	533-C	TX0096172	23-Dec-99	17:33	36	Gallons
NORTHWEST QUADRANT	1000 VOSS	SERVICE LINE STOPPED UP	BUFFALO BAYOU	490-M	TX0096172	24-Dec-99	11:16	910	Gallons
SOUTHEAST QUADRANT	7133 RUSK ST.	HOUSE LINE STOPPED UP	BUFFALO BAYOU	494-W	TX0096172	24-Dec-99	15:04	65	Gallons
NORTHEAST QUADRANT	4805 LOCKWOOD	ROUTINE STOPPAGE	BUFFALO BAYOU	454-U	TX0096172	25-Dec-99	17:57	90	Gallons
NORTHEAST QUAD	2620 N. MAIN	STOPPED UP SEWER LINE	BUFFALO BAYOU	493-H	TX0096172	26-Dec-99	17:15	37.5	Gallons
NORTHEAST QUADRANT.	17 GREENWOOD	ROUTINE STOPPAGE	BUFFALO BAYOU	494-U	TX0096172	26-Dec-99	20:33	2585	Gallons
NORTHWEST QUADRANT.	5050 YALE	ROUTINE STOPPAGE	BUFFALO BAYOU	452-H	TX0096172	28-Dec-99	15:55	2650	Gallons
NORTHEAST QUADRANT.	3302 BRILL	ROUTINE STOPPAGE	BUFFALO BAYOU	454-W	TX0096172	28-Dec-99	14:00	96	Gallons
SOUTHWEST QUADRANT	5100 1/2 BAYOU TIMBER LANE	EXCURSION CAUSED BY STOPPAGE IN COLLECTION SYSTEM	BUFFALO BAYOU	491-G	TX0062995	29-Dec-99	09:00	5000	Gallons
SOUTHEAST QUADRANT	5022 LINDSAY	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-X	TX0096172	29-Dec-99	10:34	69	Gallons
SOUTHWEST QUADRANT	13600 PERTHSHIRE	MAN HOLE OVERFLOWING	BUFFALO BAYOU	489-F	TX0096172	30-Dec-99	11:22	888	Gallons
NORTHWEST QUADRANT	10102 GREEN TREE	ROUTINE STOPPAGE	BUFFALO BAYOU	489-M	TX0063002	03-Jan-00	17:10	525	Gallons
NORTHWEST QUADRANT	11417 NORMEADOW	ROUTINE STOPPAGE	BUFFALO BAYOU	413-Y	TX0096172	03-Jan-00	12:58	60	Gallons
SOUTHWEST QUADRANT	4206 WIPPRECHT	ROUTINE STOPPAGE	BUFFALO BAYOU	454-Y	TX0096172	03-Jan-00	12:06	153	Gallons
N.E. QUADRANT	1522 LAWSON	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-X	TX0096172	05-Jan-00	12:35	65	Gallons
NORTHEAST QUADRANT.	6013 BRADY	MAIN LINE STOPPED UP.	BUFFALO BAYOU	494-T	TX0096172	05-Jan-00	13:45	50	Gallons
SOUTHWEST QUADRANT	2800 DAIRY ASHFORD	SERVICE LINE STOPPED UP	BUFFALO BAYOU	488-V	TX0058068	06-Jan-00	20:00	300	Gallons
SOUTHEAST QUADRANT	4719 CAPITOL	ROUTINE STOPPAGE	BUFFALO BAYOU	494-T	TX0096172	07-Jan-00	11:49	525	Gallons
N.E. QUAD	302 75TH STREET	ROUTINE STOPPAGE	BUFFALO	495-W	TX0035106	08-Jan-00	17:33	126	Gallons
NORTHEAST QUADRANT	3909 LEE	ROUTINE STOPPAGE	BUFFALO BAYOU	494-B	TX0096172	10-Jan-00	15:59	1210	Gallons
SOUTHWEST QUADRANT	1018 FAIRVIEW	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-N	TX0096172	10-Jan-00	12:30	1125	Gallons
SOUTHWEST QUADRANT	1018 FAIRVIEW	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-N	TX0096172	10-Jan-00	12:30	1125	Gallons
SOUTHWEST QUADRANT	900 RIVER VIEW WAY	ROUTINE STOPPAGE	BUFFALO BAYOU	491-J	TX0096172	11-Jan-00	09:40	1375	Gallons
SOUTHWEST QUADRANT	2300 WILCREST	ROUTINE STOPPAGE	BUFFALO BAYOU	489-U	TX0065307	13-Jan-00	10:45	300	Gallons
NORTHEAST	5514 COLLINGSWORTH	ROUTINE STOPPAGE	BUFFALO BAYOU	455-Y	TX0096172	13-Jan-00	19:31	30	Gallons
SOUTHWEST Q	2306 HWY. 6 S.	MAIN LINE STOPPAGE	BUFFALO BAYOU	488-N	TX0035017	14-Jan-00	10:55	595	Gallons
SOUTHEAST QUADRANT.	616 N.MILBY	MAIN LINE STOPPED UP.	BUFFALO BAYOU	494-P	TX0096172	14-Jan-00	14:00	69	Gallons
NORTHWEST QUADRANT	509 WHITEWING LN.	MAIN LINE STOPPED UP	BUFFALO BAYOU	489-J	TX0063002	17-Jan-00	11:55	80	Gallons
SOUTHEAST QUADRANT	227 EDGEWOOD	STOPPAGE IN MAIN LINE	BUFFALO BAYOU	494-T	TX0096172	18-Jan-00	07:36	2808	Gallons
NORTHEAST QUADRANT	3603 LEE	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-B	TX0096172	18-Jan-00	11:15	105	Gallons
NORTHEAST QUADRANT	125 SIDNEY	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-P	TX0096172	19-Jan-00	08:54	382	Gallons
NORTHEAST QUADRANT	701 SOLO	ROUTINE STOPPAGE	BUFFALO BAYOU	494-C	TX0096172	19-Jan-00	18:23	74	Gallons
SOUTHWEST QUADRANT	2010 FULHAM	ROUTINE STOPPAGE	BUFFALO BAYOU	490-V	TX0062995	20-Jan-00	15:20	335	Gallons
SOUTHEAST QUADRANT	4322 LEELAND	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-S	TX0096172	20-Jan-00	14:32	47	Gallons
NORTHEAST QUADRANT	1800 WOODHEAD @ RICHMOND	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-Z	TX0096172	23-Jan-00	09:40	201	Gallons
NORTH WEST QUADRANT	2928 MICHAUX	SERVICE LINE STOPPED	BUFFALO BAYOU	493-B	TX0096172	24-Jan-00	9:53	1000	Gallons
SOUTH EAST QUADRANT	250 VICTORIA DR.	ROUTINE STOPPAGE	BUFFALO BAYOU	453-E	TX0096172	24-Jan-00	9:58	1100	Gallons
SOUTHEAST QUADRANT	7457 RUSK	MAIN LINE STOPPED UP	BUFFALO BAYOU	495-W	TX0062201	26-Jan-00	10:05	204	Gallons
NORTHEAST QUADRANT	511 71ST STREET	ROUTINE STOPPAGE	BUFFALO BAYOU	495-S	TX0096172	26-Jan-00	17:35	22.5	Gallons
SOUTHEAST QUADRANT	615 N. MILBY	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-P	TX0096172	29-Jan-00	08:18	716	Gallons
SOUTHWEST QUADRANT	1911 BERING DR.	MAIN LINE STOPPAGE	BUFFALO BAYOU	491-P	TX0096172	30-Jan-00	11:03	1440	Gallons
NORTH WEST QUADRANT	1500 COHN	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-C	TX00969172	31-Jan-00	11:03	1680	Gallons
SOUTHEAST QUAD	1556 ELLIOT	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-X	TX105058	31-Jan-00	12:35	255	Gallons
NORTHEAST QUADRANT	6420 FRISCO	STOPPAGE IN MAIN LINE	BUFFALO BAYOU	453-R	TX0096172	01-Feb-00	14:14	103	Gallons
SOUTHWEST QUADRANT	2121 PELHAM	SEWAGE OVERFLOW DUE TO STOPPAGE IN LINE.	BUFFALO BAYOU	492-Q	TX0062995	03-Feb-00	09:25	1250	Gallons
SOUTHWEST QUADRANT	1300 WILCREST	SEWER BACK-UP INTO STORM SEWER	BUFFALO BAYOU	489-P	TX0088153	03-Feb-00	10:00	900	Gallons
NORTHWEST QUADRANT	20 NORTHWEST OAK	BROKEN MAIN LINE BY PUMP ON SITE	BUFFALO BAYOU	451-P	TX0096172	03-Feb-00	8:05	275	Gallons
NORTHWEST QUADRANT	757 N. ELDRIDGE	ROUTINE STOPPAGE	BUFFALO BAYOU	488-C	TX0063052	04-Feb-00	14:20	780	Gallons
NORTHWEST QUADRANT	811 W. GRAY	GEASE IN MAIN LINE	BUFFALO BAYOU	493-P	TX0063002	05-Feb-00	16:20	1500	Gallons
NORTHEAST QUADRANT	909 WACO	MAIN LINE STOPPAGE	BUFFALO BAYOU	494-F	TX0096172	05-Feb-00	19:08	12	Gallons
SOUTHEAST QUADRANT	1454 MUNGER	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-L	TX0096172	06-Feb-00	9:13	55	Gallons
SOUTHWEST QUADRANT	11414 BRIAR ROSE	ROUTINE STOPPAGE	BUFFALO BAYOU	489-P	TX0063002	07-Feb-00	10:25	100	Gallons
NORTHWEST QUADRANT	2135 SHADOWDALE	ROUTINE STOPPAGE, GREASE	BUFFALO BAYOU	449-R	TX0063002	07-Feb-00	11:17	1810	Gallons
NORTH WEST QUADRANT	1300 WILCREST	MAIN LINE STOPPED UP	BUFFALO BAYOU	489-P	TX0063002	08-Feb-00	9:20	355	Gallons
SOUTH EAST QUADRANT	2187 TROON RD.	STOPPAGE CAUSED BY BROKEN SEWER LINE	BUFFALO BAYOU	492-L	TX0096172	08-Feb-00	13:25	50	Gallons
NORTHEAST QUAD	615 N. MILBY	STOPPAGE IN MAIN LINE DUE TO GREASE BILL- UP SEWER LEAKING (OVERFLOW),CAUSING EXCURSION	BUFFALP BAYOU	494-P	TX0096172	08-Feb-00	16:50	53	Gallons
SOUTH WEST QUADRANT	1330AUGUSTA	SEWER LEAKING (OVERFLOW),CAUSING EXCURSION	BUFFALO BAYOU	492-L	TX0096172	09-Feb-00	9:05	432	Gallons
NORTH EAST QUADRANT	6134 AIRLINE	HOUSE LANE STOPPED UP , CAUSED BY GREASE	BUFFALO BAYOU	453-B	TX0096172	09-Feb-00	14:52	70	Gallons
NORTH EAST QUADRANT	4401 LOVE JOY	STOPPAGE IN A 8X8 MAIN LINE	BUFFALO BAYOU	494-P	TX0096172	09-Feb-00	21:00	45.5	Gallons
SOUTH WEST QUADRANT	5506 RUSSETT	MAIN LINE OVERFLOWING	BUFFALO BAYOU	491-K	TX0096172	09-Feb-00	8:18	396	Gallons
NORTH EAST QUADRANT	612 MCINTOSH WO#10078858	ROUTINE STOPPAGE,GREASE IN LINE	BUFFALO BAYOU	493-C	TX0096172	10-Feb-00	17:55	27.5	Gallons
NORTH EAST QUADRANT	1707 HUDY	MAIN LINE STOPPED UP, CAUSEING CLEAN OUT TO OVER FLOW	BUFFALO BAYOU	492-Q	TX00961723	10-Feb-00	14:25	105	Gallons
SOUTH WEST QUADRANT	1300 WILCREST	ROUTINE STOPPAGE	BUFFALO BAYOU	489-K	TX0063002	11-Feb-00	9:05	3900	Gallons
SOUTHWEST QUADRANT	777 BATESWOOD	STOPPAGE IN MAIN LINE	BUFFALO BAYOU	489-E	TX0035017	12-Feb-00	11:28	3600	Gallons

Problem	Location	Description	Receiving stream	Key map	Permit	Date	Time	Volume	Unit
NORTHEAST QUAD	4111 VALOR	ROUTINE STOPPAGE	BUFFALO BAYOU	454-F	TX0096172	12-Feb-00	17:37	48	Gallons
NORTHEAST QUADRANT	1706 SILVERDALE	GREASE IN MAIN LINE	BUFFALO BAYOU	495-K	TX0096172	12-Feb-00	16:04	40	Gallons
NORTH EAST QUADRANT	7319 DALLAS AVE	MAIN LINE STOPPAGE	BUFFALO BAYOU	494-Z	TX00961723	14-Feb-00	18:10	123	Gallons
NORTH EAST QUADRANT	FULTON & HOGAN	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-H	TX0096172	16-Feb-00	14:10	80	Gallons
NORTHEAST QUADRANT	109 MARSDEN	GREASE AND SAND IN MAIN LINE	BUFFALO BAYOU	494-U	TX0096172	17-Feb-00	16:49	12.5	Gallons
NORTH EAST QUADRANT	109 MARSDEN	MAIN LINE HAD STOPPAGE DUE TO SAND AND GREASE IN LINE	BUFFALO BAYOU	494-U	TX00961723	17-Feb-00	16:49	12.5	Gallons
NORTHEAST QUADRANT	3221 QUITMAN	COMMUNITY LINE STOPPED UP	BUFFALO BAYOU	494-A	TX0096172	19-Feb-00	09:05	61	Gallons
NORTH WEST QUADRANT	2118 WASHINGTON	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-L	TX0096172	20-Feb-00	7:30	1340	Gallons
NORTHEAST QUADRANT	2500 CAMPBELL	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-A	TX0096172	20-Feb-00	08:58	36.5	Gallons
NORTHEAST QUADRANT	909 WACO	6" CLEAN OUT STOPPED UP	BUFFALO BAYOU	494-F	TX0096172	20-Feb-00	10:06	151	Gallons
NORTHEAST QUADRANT	3310 NOBLES	COMMUNITY LINE STOPPED UP	BUFFALO BAYOU	494-A	TX0096172	20-Feb-00	9:10	1050	Gallons
SOUTH WEST QUADRANT	2633 WINROCK	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-S	TX0096172	21-Feb-00	18:25	550	Gallons
SOUTH WEST QUADRANT	902 WESTHIEMER	SERVICE LINE STOPPED UP CITY MAIN CLEAR	BUFFALO BAYOU	493-S	TX0096172	21-Feb-00	16:27	2118	Gallons
SOUTH EAST QUADRANT	5315 HARRISBURG	MAIN LINE STOPPED UP REPAIR PENDING, CREW IN ROUTE	BUFFALO BAYOU	494-U	TX0096172	21-Feb-00	11:28	1266	Gallons
NORTH WEST QUADRANT	5542 MARGARITA	MAIN LINE STOPPED UP ROUTINE	BUFFALO BAYOU	494-G	TX0096172	22-Feb-00	10:41	114	Gallons
NORTH EAST QUADRANT	111 SHOTWELL	MAIN LINE STOPPED UP/ROUTINE	BUFFALO BAYOU	494-C	TX0096172	22-Feb-00	9:50	119.5	Gallons
SOUTHWEST QUADRANT	3809 MAIN	ROUTINE STOPPAGE, GREASE AND SAND	BUFFALO BAYOU	493-T	TX0096172	22-Feb-00	19:18	1480	Gallons
NORTHWEST QUADRANT	1514 WHITE OAK DRIVE	ROUTINE STOPPAGE	BUFFALO BAYOU	493-B	TX0096172	23-Feb-00	08:15	358	Gallons
NORTHEAST QUADRANT	200 DENNIS	ROUTINE STOPPAGE	BUFFALO BAYOU	493-T	TX0096172	23-Feb-00	08:50	21	Gallons
SOUTH WEST QUADRANT	2121 PELHAM	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-Q	TX0096172	24-Feb-00	11:22	1575	Gallons
NORTHEAST QUADRANT	920 ALTIC	SEWER MAIN STOPPED UP	BUFFALO BAYOU	494-T	TX0096172	24-Feb-00	14:35	125	Gallons
SOUTH EAST QUADRANT	222S.66th STREET	MAIN LINE STOPPED UP/ROUTINE	BUFFALO BAYOU	494-R	TX0096172	24-Feb-00	10:28	1800	Gallons
NORTHEAST QUADRANT	11952 HEMPSTEAD	C-2 DYE TEST GOING TO BAYOU	BUFFALO BAYOU	451-I	TX0096172	26-Feb-00	15:46	496	Gallons
NORTHWEST QUADRANT	4702 LIDO	MAIN LINE STOPPAGE-LINE BROKEN	BUFFALO BAYOU	451-H	TX0096172	26-Feb-00	16:16	474	Gallons
NORTHWEST QUADRANT	7108 AVENUE J	ROUTINE STOPPAGE	BUFFALO BAYOU	494-V	TX0096172	27-Feb-00	12:56	87	Gallons
NORTH EAST QUADRANT	8433 DARLINGTON	MAIN LINE STOPPED UP	BUFFALO BAYOU	455-L	TX0096172	28-Feb-00	10:11	55	Gallons
SOUTHEAST QUADRANT	4731 RUSK	ROUTINE STOPPAGE CAUSED BY GREASE AND SAND	BUFFALO BAYOU	494-T	TX0096172	28-Feb-00	11:27	104	Gallons
SOUTHEAST QUADRANT	927 NASHUA	SEWER MAIN STOPPAGE SERV LINE WILL NEED TO BE CHLORINAT	BUFFALO BAYOU	492-C	TX0096172	28-Feb-00	11:42	555	Gallons
NORTHEAST QUADRANT	4401 LOVEJOY	STOPPAGE IN LINE	BUFFALO BAYOU	494-P	TX0096172	28-Feb-00	17:18	14	Gallons
NORTHEAST QUADS	913 TERMINAL	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-V	TX0096172	29-Feb-00	15:15	75	Gallons
NORTHWEST QUADS	4020 MEADOW LAKE	SEWER MAIN STOPPED UP	BUFFALO BAYOU	492-N	TX0096172	29-Feb-00	09:30	840	Gallons
SOUTHEAST QUADRANT	714 MEMORIAL MEWS ST.	SEWER MAIN STOPPED UP	BUFFALO BAYOU	575-H	TX0035017	02-Mar-00	10:29	740	Gallons
NORTH EAST QUADRANT	909 WACO	CITY MAIN HAS STOPPAGE	BUFFALO BAYOU	494-H	TX0096172	03-Mar-00	10:06	22	Gallons
SOUTH WEST QUADRANT	2300 1/2 HUTTON	ROUTINE STOPPAGE	BUFFALO BAYOU	494-B	TX0096172	03-Mar-00	16:43	25	Gallons
SOUTHWEST QUADRANT.	2815 ROCK ARBOR	MAIN LINE STOPPED UP.	BUFFALO BAYOU	490-T	TX0063002	04-Mar-00	11:49	550	Gallons
SOUTHEAST QUADRANT	706 MORRIS	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-C	TX0096172	04-Mar-00	10:00	48	Gallons
SOUTHWEST QUADRANT	2826 WESTERLAND	MAIN LINE STOPPED UP	BUFFALO BAYOU	490-T	TX0063002	05-Mar-00	10:00	1050	Gallons
NORTHEAST QUADRANT.	1405 COPELAND	STOPPAGE IN MAIN LINE.	BUFFALO BAYOU	494-F	TX0096172	06-Mar-00	15:51	69	Gallons
NORTHWEST QUADRANT	3125 CRESTDALE	MAIN LINE STOPPED UP DUE TO HEAVY GREASE IN LINE	BUFFALO BAYOU	450-K	TX0063002	07-Mar-00	08:45	1200	Gallons
NORTHWEST QUADRANT	9001 KEMPWOOD	MAIN LINE STOPPED UP DUE TO GREASE IN LINE	BUFFALO BAYOU	450-Q	TX0063002	07-Mar-00	10:02	1500	Gallons
SOUTH EAST QUADRANT	1100 CAROLINE/ LAMAR	SEWER MAIN STOPPAGE	BUFFALO BAYOU	493-Q	TX0096172	07-Mar-00	10:12	4125	Gallons
SOUTH EAST QUADRANT	400 PACIFIC	SEWEWR MAIN STOPPED UP	BUFFALO BAYOU	493-N	TX0096172	07-Mar-00	10:12	786	Gallons
NORTHWEST QUADRANT.	6024 SOUTHRIDGE	MAIN LINE STOPPED UP.	BUFFALO BAYOU	534-P	TX0096172	07-Mar-00	10:22	232	Gallons
NORTHWEST QUADRANT	202 TRAVIS	STOPPAGE IN LINE, FLOWING INTO STORM DRAIN	BUFFALO BAYOU	493-L	TX0096172	07-Mar-00	13:58	610	Gallons
SOUTHWEST QUADRANT	239 EMERSON	CITY MAIN STOPPED UP	BUFFALO BAYOU	493-S	TX0096172	07-Mar-00	16:15	5175	Gallons
NORTH WEST QUADRANT	2001 LOVERNE	MAIN LINE STOPPAGE CAUSED BY HEAVY GREASE	BUFFALO BAYOU	450-V	TX0063002	09-Mar-00	10:29	984	Gallons
SOUTH EAST QUADRANT	5107 STONEWALL	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-T	TX0096172	09-Mar-00	20:00	290	Gallons
SOUTH EAST QUADRANT	4052 JEWEL	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-B	TX0096172	09-Mar-00	22:03	468	Gallons
SOUTH EAST QUADRANT	2810 BERRY	ROUTINE STOPPAGE CAUSED BY GREASE AND SAND	BUFFALO BAYOU	493-Y	TX0096172	09-Mar-00	10:05	1620	Gallons
SOUTHEAST QUADRANT	1902 AUGUSTA DR.	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-P	TX0096172	11-Mar-00	12:12	288	Gallons
NORTHWEST QUAD	8538-8539 ALCOTT	ROUTINE STOPPAGE, MAIN LINE	BUFFALO BAYOU	450-R	TX0096172	14-Mar-00	10:27	680	Gallons
SOUTHEAST	422 W. TRAY	SERVICE LINE STOPPED UP	BUFFALO BAYOU	452-D	TX0096172	14-Mar-00	12:40	210	Gallons
SOUTHEAST QUAD	904 BRISCO	CUSTOMER NOT TIED INTO SYSTEM.	BUFFALO BAYOU	453-R	TX0096172	15-Mar-00	08:18	381	Gallons
NORTHEAST	904 FRISCO	CUSTOMER NOT TIED INTO SYSTEM WHEN THEY FLUSH INTO DITC	BUFFALO BAYOU	453-R	TX0096172	15-Mar-00	8:18	201	Gallons
SOUTHWEST QUADS	2923 INWOOD	ROUTINE STOPPAGE	BUFFALO BAYOU	492-Q	TX0096172	15-Mar-00	14:46	995	Gallons
NORTHEAST QUAD	1201 NOBLE	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-D	TX0096172	15-Mar-00	12:30	60	Gallons
NORTHEAST QUAD	1201 NOBLE	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-D	TX0096172	15-Mar-00	12:30	60	Gallons
SOUTHEAST QUAD	905 OAKHURST	MAIN LINE STOP UP AT CONNECTION	BUFFALO BAYOU	494-S	TX0096172	16-Mar-00	16:41	88	Gallons
SOUTHEAST	9310 LONG POINT	SEWER MAIN STOPPED UP	BUFFALO BAYOU	450-Y	TX0096172	16-Mar-00	13:00	356	Gallons
SOUTHEAST QUADRANT.	205 SUPER	ROUTINE STOPPAGE	BUFFALO BAYOU	494-T	TX0096172	17-Mar-00	12:15	53	Gallons
SOUTHEAST QUADRANT	5513 NEWPORT	MAIN LINE STOPPED-UP	BUFFALO BAYOU	534-C	TX0096172	18-Mar-00	18:10	33	Gallons
SOUTHEAST QUAD	5107 STONEWALL	ROUTINE STOPPAGE	BUFFALO BAYOU	494-T	TX0096172	18-Mar-00	12:00	37	Gallons
SOUTHEAST QUAD	1916 BALDWIN	OVERFLOW FROM CLEANOUT CAUSING EXCURSION IN FRONT	BUFFALO BAYOU	493-P	TX0096172	19-Mar-00	07:42	1840	Gallons
NORTHWEST QUADRANT	5216 CHENEVERT	ROUTINE STOPPAGE	BUFFALO BAYOU	493-Q	TX0096172	20-Mar-00	8:35	590	Gallons
SOUTHWEST QUADRANT	11514 BRIAR ROSE	SERVICE LINE STOPPAGE	BUFFALO BAYOU	489-P	TX0063002	21-Mar-00	13:05	680	Gallons
SOUTHWEST QUADRANT	2509 DRISCOLL	MAIN LINE AND SERVICE LIN STOPPED UP	BUFFALO BAYOU	492-V	TX0096172	21-Mar-00	8:24	183	Gallons
SOUTHEAST QUAD	2519 LORRAINE	COMMUNITY LINE STOPPED UP	BUFFALO BAYOU	494-E	TX0096172	22-Mar-00	09:11	79	Gallons
NORTHWEST QUAD	3317JEFFERSON	COMMUNITY LINE STOPPED UP CAUSING OVER FLOW	BUFFALO BAYOU	493-V	TX0096172	22-Mar-00	11:49	658	Gallons
NORTHWEST QUAD	2907 JEWELL	COMMUNITY LINE STOPPED.	BUFFALO BAYOU	494-A	TX0096172	22-Mar-00	13:00	1700	Gallons
NORTHWEST QUADRANT	2210 WENTWORTH	ROUTINE STOPPAGE	BUFFALO BAYOU	493-X	TX0096172	22-Mar-00	15:00	561	Gallons
SOUTHEAST QUAD	315 E.10TH STREET	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-A	TX0035009	23-Mar-00	08:00	4209	Gallons
SOUTHWEST QUADRANT	1714 HUDLY	SEWER MAIN STOPPED UP CAUSING FLOOD IN BACK YARD OF SEW	BUFFALO BAYOU	442-Q	TX0096172	23-Mar-00	10:35	2620	Gallons
SOUTHWEST QUADRANT	QUADRANT	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-Z	TX0096172	23-Mar-00	14:30	605	Gallons
NORTHWEST Q	9009 RICHMOND	ROUTINE STOPPAGE	BUFFALO BAYOU	490-X	TX0063002	24-Mar-00	11:00	97	Gallons
NORTHWEST	12219 COBBLESTONE	SERVICE LINE STOPPED UP, SPREAD 3LBS OF PO19	BUFFALO BAYOU	490-E	TX0063002	24-Mar-00	7:57	724	Gallons
SOUTHEAST Q	1628 HARVARD	SEWER LINE STOPPED UP	BUFFALO BAYOU	493-A	TX0096172	24-Mar-00	10:23	674	Gallons
SOUTHEAST QUAD	542 N.EASTWOOD	MAIN LINE STOPPAGE	BUFFALO BAYOU	494-P	TX0096172	24-Mar-00	11:36	98	Gallons

Problem	Location	Description	Receiving stream	Key map	Permit	Date	Time	Volume	Unit
SOUTHEAST QUAD	1900 EASTWOOD	MAIN LINE STOPPAGE.	BUFFALO BAYOU	494-W	TX0096177	24-Mar-00	13:43	105	Gallons
NORTHWEST QUAD	1119 LASHBROK	SEWER MAIN AND SERVICE LINE STOPPED UP	BUFFALO BAYOU	489-J	TX0063002	25-Mar-00	09:04	1110	Gallons
NORTHEAST	#3 CANAL	ROUTINE STOPPAGE	BUFFALO BAYOU	527-N	TX0096172	25-Mar-00	10:55	498	Gallons
NORTHEAST QUAD	101 EAST GATE	MAIN LINE STOPPED UP	BUFFALO BAYOU	495-W	TX0096172	25-Mar-00	19:50	39	Gallons
SOUTHEAST QUADRANT	#3 CANAL	ROUTINE STOPPAGE	BUFFALO BAYOU	494-P	TX0096172	25-Mar-00	10:55	498	Gallons
SOUTHEAST QUADRANT	110 LATHAM	ROUTINE STOPPAGE	BUFFALO BAYOU	494-P	TX0096172	25-Mar-00	09:45	58	Gallons
SOUTHEAST QUAD	5110 LATHAM	ROUTINE STOPPAGE	BUFFALO BAYOU	494-V	TX0096172	25-Mar-00	09:45	58	Gallons
NORTHEAST QUAD	2801 CLINE	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-J	TX0096172	27-Mar-00	13:50	2740	Gallons
SOUTHEAST QUAD	2110 N. BRYAN	MAIN LINE STOPPED UP.	BUFFALO BAYOU	494-T	TX0096172	27-Mar-00	11:30	2100	Gallons
SOUTHWEST QUAD	1755 COLQUITT	SERVICE LINE STOPPED	BUFFALO BAYOU	492-Z	TX0096172	27-Mar-00	16:14	180	Gallons
NORTHEAST QUAD	3807 WALKER	ROUTINE STOPPAGE CAUSED BY GREASE AND SAND	BUFFALO BAYOU	454-S	TX0096172	27-Mar-00	12:37	2774	Gallons
SOUTHWEST QUAD	615 PEDEN	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-N	TX0096172	29-Mar-00	9:33	174.5	Gallons
NORTHWEST Q	915 W. CAVALCADE	MAIN LINE STOPPED UP	BUFFALO BAYOU	453-T	TX0096172	29-Mar-00	12:40	396	Gallons
NORTHWEST QUAD	1610 BRINGHURST	SERVICE LINE STOPPED UP	BUFFALO BAYOU	494-K	TX0096172	29-Mar-00	13:10	72	Gallons
NORTHEAST QUAD	4207 OATS	COMMUNITY LINE STOPPED UP	BUFFALO BAYOU	494-E	TX0096172	29-Mar-00	13:13	81	Gallons
NORTHEAST Q	2115 GANO	COMMUNITY LINE STOPPED UIIP	BUFFALO BAYOU	493-D	TX0096172	29-Mar-00	13:11	151	Gallons
SOUTHEAST QUAD	1702 WRIT	MAIN LINE STOPPED UP	BUFFALO BAYOU	451-X	TX0096172	29-Mar-00	17:20	1942	Gallons
SOUTHEAST QUAD	3210 GARROW	COMMUNITY LINE STOPPED UP	BUFFALO BAYOU	494-N	TX0096172	31-Mar-00	17:40	49140	Gallons
NORTHWEST QUADRANT	1110 STUDE	CITY MAIN STOPPED UP	BUFFALO BAYOU	493-A	TX0096172	01-Apr-00	10:38	810	Gallons
NORTHWEST QUADS	2222 WEST LOOP SOUTH	MAIN LINE STOPPAGE	BUFFALO BAYOU	491-V	TX0063002	02-Apr-00	09:21	255	Gallons
NORTHEAST QUAD	4400 COYLE	MAIN LINE STOPPAGE	BUFFALO BAYOU	494-W	TX0096172	02-Apr-00	9:46	1134	Gallons
SOUTHWEST QUAD	12714 WIDLEY CIR	SEWER SERVECE STOPPED UP CAUSING EXCURSION	BUFFALO BAYOU	488-M	TX0035017	03-Apr-00	12:12	536	Gallons
SOUTHEAST QUAD	4925 MCKINNEY	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-T	TX0096172	03-Apr-00	10:24	216	Gallons
NORTHEAST	543 N. SUPER	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-P	TX0096172	03-Apr-00	15:00	195	Gallons
SOUTHEAST QUAD	3201 ALABAMA	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-T	TX0096172	03-Apr-00	14:16	184	Gallons
NORTHEAST	2413 GENTRY	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-C	TX0096172	03-Apr-00	16:12	216	Gallons
NORTHWEST QUAD	9310 LONG POINT	MAIN LINE STOPPED UP	BUFFALO BAYOU	450-U	TX0096172	04-Apr-00	13:20	1005	Gallons
NORTHEAST QUAD	4401 AVERILL	ROUTINE STOPPAGE	BUFFALO BAYOU	453-Y	TX0096172	04-Apr-00	16:29	582	Gallons
NORTHEAST QUAD	2115 DAVIS	SERVICE LINE STOPPED UP	BUFFALO BAYOU	494-A	TX0096172	05-Apr-00	9:40	184	Gallons
NORTHEAST QUAD	2120 MAURY	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-H	TX0096172	05-Apr-00	10:01	525	Gallons
SOUTHEAST QUAD	2606 HARRINGTON	SERVICE LINE STOPPED UP.	BUFFALO BAYOU	494-E	TX0096172	05-Apr-00	13:44	492	Gallons
SOUTHWEST QUAD	1627 MILFORD	MAIN LINE STOPPED UP.	BUFFALO BAYOU	492-Z	TX0096172	05-Apr-00	13:00	113	Gallons
SOUTHWEST QUAD	1627 MILFORD	MAIN LINE STOPPED UP ROUTINE STOPPAGE.	BUFFALO BAYOU	492-Z	TX0096172	05-Apr-00	13:00	113	Gallons
SOUTHWEST QUAD	3422 TIMMONS	CITY MAIN STOPPED UP.	BUFFALO BAYOU	492-S	TX0096172	05-Apr-00	21:34	4275	Gallons
SOUTHWEST QUAD	13102 RICHMOND	SERVICE HOLD IN REAR.	BUFFALO BAYOU	488-Y	TX0035017	06-Apr-00	17:24	360	Gallons
SOUTHWEST QUAD	5200 WOODHEAD	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-Z	TX0096172	06-Apr-00	10:25	145	Gallons
SOUTHWEST QUAD	3101 S. SHEPERD	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-U	TX0096172	06-Apr-00	07:55	155	Gallons
SOUTHEAST QUAD	2511 GANO	MAIN LINE STOPPED UP.	BUFFALO BAYOU	493-D	TX0096172	07-Apr-00	8:12	60	Gallons
SOUTHWEST QUAD	2113 BRUN	MAIN LINE STOPPED UP, ROUTINE STOPPAGE.	BUFFALO BAYOU	492-R	TX0096172	07-Apr-00	9:02	152	Gallons
SOUTHWEST QUAD	1736 INDIANA	MAIN LINE STOPPED UP, ROUTINE STOPPAGE	BUFFALO BAYOU	492-R	TX0096172	07-Apr-00	08:49	302	Gallons
NORTHWEST QUAD	10655 KATY FREEWAY	MAIN LINE STOPPED UP	BUFFALO BAYOU	489-C	TX0035017	08-Apr-00	14:04	420	Gallons
NORTHEAST QUAD	920 ALTIC	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-T	TX0096172	08-Apr-00	16:50	1370	Gallons
NORTHEAST QUAD	300 S. 75TH	MAIN LINE STOPPED UP	BUFFALO BAYOU	495-W	TX0096172	08-Apr-00	18:42	272	Gallons
NORTHEAST QUAD	706 MORRIS	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-C	TX0096172	09-Apr-00	4:00	286	Gallons
NORTHEAST QUAD	5520 CAVALCADE	MAIN LINE STOPPED UP	BUFFALO BAYOU	454-Y	TX0096172	09-Apr-00	10:46	120	Gallons
NORTHEAST QUAD	4001 AVERILL	STOPPAGE IN MAIN LINE	BUFFALO BAYOU	453-Y	TX0096172	09-Apr-00	19:33	214	Gallons
SOUTHWEST QUAD	3619 S. SHEPHERD	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-Y	TX0096172	09-Apr-00	21:28	4710	Gallons
SOUTHEAST QUAD	14 GREENWOOD	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-U	TX0096172	10-Apr-00	18:25	1225	Gallons
NORTHWEST QUAD	1300 WILCREST	MAIN LINE STOPPED UP.	BUFFALO BAYOU	489-K	TX0063002	12-Apr-00	13:09	889	Gallons
NORTHEAST QUAD	1612 SHERPHERD	MAIN LINE STOPPED UP.	BUFFALO BAYOU	492-H	TX0096172	12-Apr-00	13:42	592	Gallons
SOUTHWEST QUAD	2907 ALBANY	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-P	TX0096172	13-Apr-00	11:45	335	Gallons
NORTHWEST QUAD	2222WEST LOOP SOUTH	SEWER MAIN STOPPED UP.	BUFFALO BAYOU	491-R	TX0096172	13-Apr-00	13:10	420	Gallons
NORTHWEST QUADRANT	2503 SOUTH GESSNER	MAIN LINE STOPPAGE,CAUSING MANHOLE TO OVERFLOW	BUFFALO BAYOU	490-S	TX0063002	14-Apr-00	08:48	368	Gallons
NORTHEAST QUAD	1900 EASTWOOD	MAIN LINE STOPPED UP.	BUFFALO BAYOU	494-W	TX0096172	14-Apr-00	13:00	1800	Gallons
SOUTHEAST QUADRANT	106 BURR	SERVICE LINE STOPPED UP	BUFFALO BAYOU	494-P	TX0096172	14-Apr-00	14:58	340	Gallons
SOUTHWEST QUADRANT	11427 BRIARFOREST	MAIN LINE STOPPED UP	BUFFALO BAYOU	489-P	TX0063002	15-Apr-00	15:18	114	Gallons
NORTHWEST QUADRANT	1339 WINROCK	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-N	TX0096172	15-Apr-00	19:00	600	Gallons
SOUTHWEST QUADRANT	12639 ASHFORD MEADOW	ROUTINE STOPPAGE	BUFFALO BAYOU	488-V	TX0035017	16-Apr-00	13:45	45	Gallons
SOUTHEAST QUADRANT	4434 CLAY	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-S	TX0096172	16-Apr-00	14:30	495	Gallons
SOUTHWEST QUADRANT	5150 HILDAGO	MANHOLE OVERFLOWING CAUSING EXCURSION	BUFFALO BAYOU	491-U	TX0096172	16-Apr-00	10:15	682	Gallons
SOUTHWEST	2903 BERING	REPAIR PENDING ON MAIN LINE	BUFFALO BAYOU	491-T	TX0062995	17-Apr-00	13:06	780	Gallons
SOUTHEAST QUAD	2100 PEASE	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-V	TX0096172	17-Apr-00	17:50	500	Gallons
NORTHWEST QUAD	2903 BERING	REPAIR PENDING ON MAIN LINE	BUFFALO BAYOU	491-T	TX0062995	17-Apr-00	13:06	ON GOING	
SOUTHEAST QUAD	1711 GANO	COMMUNITY LINE STOPPED UP.	BUFFALO BAYOU	493-H	TX0096172	18-Apr-00	13:40	1696	Gallons
SOUTHWEST QUAD	4321 HARZARD	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-Z	TX0096172	18-Apr-00	9:20	1017	Gallons
SOUTHWEST QUAD	2701 WESTLANE	MAIN STOPPED UP	BUFFALO BAYOU	491-V	TX0062995	19-Apr-00	18:04	2210	Gallons
SOUTHEAST QUAD	6110 FAIRDALE	MAIN LINE OVERFLOWING INTO STORM SEWER.	BUFFALO BAYOU	491-W	TX0096172	19-Apr-00	13:00	435	Gallons
NORTHWEST QUAD	7425 MARILYN	MAIN LINE STOPPED UP	BUFFALO BAYOU	415-W	TX0025291	21-Apr-00	14:30	258	Gallons
SOUTHEAST QUADRANT	3419 MCGOWEN	MAIN LINE STOPPED UP-REPAIRS PENDING ON MAIN	BUFFALO BAYOU	493-Z	TX0062201	21-Apr-00	8:48	1	Gallons
NORTHEAST QUAD	605 BERRY RD.	MAIN LINE STOPPED UP	BUFFALO BAYOU	453-G	TX0096172	21-Apr-00	19:49	235	Gallons
SOUTHWEST QUAD	3903 HARTSDALE	MANHOLE OVERFLOW IN STREET	BUFFALO BAYOU	490-Z	TX0096172	21-Apr-00	20:40	2143	Gallons
SOUTHWEST QUAD	3300 GRAUSTARK ST	MAIN STOPPED UP CAUSING MANHOLE TO OVERFLOW ONTO STREET	BUFFALO BAYOU	493-S	TX00096172	22-Apr-00	8:07	980	Gallons
NORTHWEST QUAD	8807 EMNORA	MAIN LINE STOPPED UP CAUSING MANHOLE TO OVERFLOW	BUFFALO BAYOU	450-R	TX0063002	22-Apr-00	9:34	242	Gallons
NORTHWEST QUAD	11514 BRIAR ROSE DR	OVER FLOW IN YARD CAUSING EXCURSION	BUFFALO BAYOU	489-P	TX0063002	23-Apr-00	13:50	1420	Gallons
NORTHEAST QUAD	2212 PANNELL	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-B	TX0096172	24-Apr-00	17:35	46	Gallons
NORTHEAST QUAD	2819 FOX	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-J	TX0096172	24-Apr-00	16:52	500	Gallons
SOUTHWEST QUADRANT	2701 WESTLANE	ROUTINE STOPPAGE	BUFFALO BAYOU	491-V	TX0096172	24-Apr-00	17:12	414	Gallons
N/A	8500 CYPRESS	HL&P CUT THE MAIN ELECTRICAL POWER TO LIFT STATION	BUFFALO BAYOU	535-B	TX0105058	25-Apr-00	15:00	95000	Gallons
SOUTHWEST QUAD	933N WILCREST	MAIN LINE STOPPED UP.	BUFFALO BAYOU	489-B	TX0063002	26-Apr-00	13:30	270	Gallons
NORTHEAST QUAD	6811 FORCE	MAINLINE STOPPED UP	BUFFALO BAYOU	494-D	TX0096172	26-Apr-00	10:18	128	Gallons
SOUTHWEST QUAD	14935 KIMBERLY	COMMUNITY LINE STOPPED UP	BUFFALO BAYOU	488-G	TX0096172	26-Apr-00	8:53	1660	Gallons
NORTHEAST QUAD	2219 CHAPMAN	OVERFLOW CAUSING EXCURSION	BUFFALO BAYOU	493-D	TX0096172	26-Apr-00	13:58	16	Gallons

Problem	Location	Description	Receiving stream	Key map	Permit	Date	Time	Volume	Unit
NORTHEAST QUAD	711 MCINTOSH	SSERVICE LINE STOPPED UP	BUFFALO BAYOU	493-C	TX0096172	26-Apr-00	21:32	219	Gallons
NORTHEAST QUAD	401 GARGAN	SERVICE LINE STOPPED UP	BUFFALO BAYOU	493-D	TX0096172	26-Apr-00	17:40	116	Gallons
NORTHEAST QUAD	920 ALTIC	ROUTINE STOPPAGE	BUFFALO BAYOU	494-T	TX0096172	26-Apr-00	19:30	1730	Gallons
SOUTHWEST QUAD	4700 MONTROSE	ROUTINE STOPPAGE	BUFFALO BAYOU	493-W	TX0096172	27-Apr-00	8:18	65	Gallons
SOUTHEAST QUAD	920 ALTIC ST	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-U	TX0096172	27-Apr-00	8:00	100	Gallons
NORTHWEST QUAD	502 MAIN	SEWER LINE STOPPED UP	BUFFALO BAYOU	493-L	TX0096172	27-Apr-00	13:50	124	Gallons
SOUTHEAST QUAD	7006 TUCK	SERVICE LINE STOPPED UP	BUFFALO BAYOU	494-M	TX0096172	27-Apr-00	13:30	65	Gallons
NORTHEAST QUAD	8701 IRVINGTON	ROUTINE STOPPAGE		454-P	TX0063029	28-Apr-00	14:09	72	Gallons
NORTHWEST QUAD	1911 COLQUITT	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-K	TX0063002	28-Apr-00	11:28	36	Gallons
SOUTHWEST QUADRANT	2317 MORSE	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-Y	TX0096172	28-Apr-00	10:13	136	Gallons
NORTHEAST QUADS	6822 VICTORIA	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-D	TX0096172	28-Apr-00	07:51	1680	Gallons
SOUTHWEST QUAD	2701 WEST LANE	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-N	TX0096172	29-Apr-00	16:26	1045	Gallons
NORTHEAST QUAD	309 S. 72ND STREET	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-Z	TX0096172	29-Apr-00	16:35	210	Gallons
NORTHEAST QUAD	310 N. SAINT CHARLES	ROUTINE STOPPAGE	BUFFALO BAYOU	494-J	TX0096172	29-Apr-00	08:33	62	Gallons
NORTHEAST QUAD	#69 & #70 SADDLEBROOK	ROUTINE STOPPAGE	BUFFALO BAYOU	491-B	TX0096172	29-Apr-00	10:47	600	Gallons
NORTHWEST QUAD	5200 WOODHEAD	ROUTINE STOPPAGE	BUFFALO BAYOU	492-Z	TX0063002	30-Apr-00	13:55	620	Gallons
NORTHWEST QUAD	11514 BRIAR ROSE	STOPPAGE IN MAIN LINE CAUSED BY GREASE AND SAND	BUFFALO BAYOU	489-P	TX0063002	30-Apr-00	09:05	605	Gallons
NORTHWEST QUAD	4233 BETTIS	ROUTINE STOPPAGE	BUFFALO BAYOU	491-V	TX0096172	30-Apr-00	16:16	194	Gallons
NORTHWEST QUAD	614 FAIRVIEW	ROUTINE STOPPAGE	BUFFALO BAYOU	493-N	TX0096172	30-Apr-00	16:55	126	Gallons
NORTHWEST QUAD	1613 SHEPHERD	ROUTINE STOPPAGE	BUFFALO BAYOU	492-H	TX0096172	30-Apr-00	12:50	275	Gallons
NORTHWEST QUAD	1612 SHEPHERD	ROUTINE STOPPAGE	BUFFALO BAYOU	492-H	TX0096172	30-Apr-00	12:50	275	Gallons
NORTHWEST QUAD	1801 DURHAM	ROUTINE STOPPAGE	BUFFALO BAYOU	452-G	TX0096172	30-Apr-00	12:12	304	Gallons
SOUTHWEST QUADRANT	900 STANFORD @ W. DALLAS	MANHOLE STOPPED UP	BUFFALO BAYOU	493-N	TX0057347	01-May-00	16:02	176	Gallons
SOUTHEAST QUADRANT	1923 LOMBARDY	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-X	TX0096172	01-May-00	10:05	711	Gallons
SOUTHEAST QUADRANT	615 FEAMSTER	MAIN LINE STOPPED UP	BUFFALO BAYOU	453-E	TX0096172	02-May-00	10:35	162	Gallons
NORTHWEST QUADRANT	9855 PAGEWOOD	MAIN LINE STOPPED UP	BUFFALO BAYOU	490-W	TX0063002	03-May-00	22:29	477	Gallons
SOUTHWEST QUADRANT	2620 S. SHEPHERD	SERVICE LINE OVERFLOW INTO STORM DRAIN	BUFFALO BAYOU	492-U	TX0096172	03-May-00	10:48	537	Gallons
SOUTHWEST QUADS	1900 FAIRVIEW & MORSE	COMING UP ON TO STREET, GOING INTO STORM SEWER	BUFFALO BAYOU	492-V	TX0096172	03-May-00	12:14	525	Gallons
NORTHEAST QUADRANT	5109 POLK	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-X	TX0096172	04-May-00	8:45	306	Gallons
SOUTHEAST QUADRANT	1400 WRIGHTWOOD	SERVICE LINE STOPPED UP	BUFFALO BAYOU	493-C	TX0096172	04-May-00	14:12	63	Gallons
SOUTHEAST QUADRANT	901 W. GRAY	SERVICE LINE STOPPED UP	BUFFALO BAYOU	493-N	TX0096172	04-May-00	14:39	199	Gallons
NORTHEAST QUADRANT	6636 EUREKA	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-B	TX0096172	04-May-00	8:24	3070	Gallons
SOUTHWEST QUADS	1655 HAWTHORNE	ROUTINE STOPPAGE	BUFFALO BAYOU	492-F	TX0034924	05-May-00	13:40	110	Gallons
SOUTHWEST QUADRANT	4049 WICKERSHAM	ROUTINE STOPPAGE DUE TO EXCESS GREASE	BUFFALO BAYOU	492-S	TX0062995	05-May-00	11:21	68	Gallons
SOUTHWEST QUADS	2308 SULFOLK	ROUTINE STOPPAGE	BUFFALO BAYOU	491-V	TX0063002	05-May-00	13:15	1185	Gallons
NORTHEAST QUADS	4629 BELL	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-X	TX0096172	05-May-00	19:46	520	Gallons
NORTHEAST QUADRANT	2004 N. WAYSIDE	SERVICE LINE STOPPED UP	BUFFALO BAYOU	495-A	TX0096172	05-May-00	18:35	1565	Gallons
NORTHWEST QUADS	11514 BRAIR ROSE	ROUTINE STOPPAGE FROM GREASE	BUFFALO BAYOU	482-P	TX0063002	06-May-00	09:16	621	Gallons
NORTHEAST	902 GRACE LAND	MAIN LINE STOPPED UP	BUFFALO BAYOU	453-V	TX0096172	06-May-00	19:16	104	Gallons
NORTHWEST QUADRANT	1609 BEACONSHIRE	ROUTINE STOPPAGE DUE TO EXCESS GREASE	BUFFALO BAYOU	488-Q	TX0035017	07-May-00	10:45	735	Gallons
NORTHEAST QUADRANT	103 BEDFORD ST.	SERVICE LINE OVERFLOWING ONTO STREET AND STORM DRAIN	BUFFALO BAYOU	495-W	TX0035106	08-May-00	18:40	860	Gallons
NORTHEAST QUADRANT	4601 WALKER	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-T	TX0096172	08-May-00	13:40	675	Gallons
NORTHEAST QUADRANT	2509 GENTRY	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-C	TX0096172	08-May-00	09:37	144	Gallons
NORTHEAST QUADRANT	1400 WRIGHTWOOD	ROUTINE STOPPAGE	BUFFALO BAYOU	493-C	TX0096172	08-May-00	07:37	1128	Gallons
SOUTHEAST QUADRANT	8256 LENORE	SERVICE LINE STOPPED UP	BUFFALO BAYOU	535-V	TX0105058	08-May-00	12:41	132	Gallons
NORTHEAST QUADRANT	4120 WALKER	ROUTINE STOPPAGE	BUFFALO BAYOU	494-S	TX0096172	09-May-00	12:51	19	Gallons
SOUTHEAST QUADRANT	3071 LOCKE	ROUTINE STOPPAGE	BUFFALO BAYOU	492-U	TX0096172	09-May-00	15:00	404	Gallons
NORTHEAST	6 CLIFTON	RIGHT OF WAY MAINTANCE PULLED SERVICE LINE OUT	BUFFALO BAYOU	494-V	TX0096172	09-May-00	11:45	549	Gallons
NORTHEAST QUADS	1900 EASTWOOD AT HARDY	ROUTINE STOPPAGE	BUFFALO BAYOU	494-W	TX0096172	10-May-00	08:19	1385	Gallons
NORTHEAST QUADS	3903 DREW ST.	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-W	TX0096172	10-May-00	08:30	588	Gallons
NORTHEAST QUADRANT	6709 AVE O	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-R	TX0096172	10-May-00	12:12	253	Gallons
NORTHEAST QUADS	2211 PANNELL	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-B	TX0096172	10-May-00	13:13	554.5	Gallons
NORTHEAST QUADRANT	1900 EASTWOOD	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-P	TX0096172	11-May-00	21:58	980	Gallons
NORTHEAST QUADRANT	404 QUITMAN	MAIN LINE STOPPED UP.	BUFFALO BAYOU	493-C	TX0096172	12-May-00	09:33	320	Gallons
NORTHWEST QUADRANT	1800 CONGRESS	STOPPAGE IN CITY MAIN	BUFFALO BAYOU	493-M	TX0096172	13-May-00	17:11	1020	Gallons
N/A	WEST DISTRICT WWTP	BLEACH LINE CAME LOSE AT PUMP CREATING BLEACH SPILL	BUFFALO BAYOU	489-L	TX0063002	14-May-00	10:00	3200	Gallons
NORTHEAST QUADRANT	2212 PANNELL	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-B	TX0096172	15-May-00	08:42	34	Gallons
NORTHEAST QUADRANT	2014 WEST ST.	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-A	TX0096172	15-May-00	13:34	35.5	Gallons
SOUTHWEST QUADRANT	13023 WICKERSHAM	PUMP STATION WAS DOWN	BUFFALO BAYOU	488-U	TX0096172	15-May-00	10:50	1600	Gallons
SOUTHWEST QUADRANT	5100 RICHMOND	ROUTINE STOPPAGE	BUFFALO BAYOU	491-Y	TX0096172	15-May-00	18:05	425	Gallons
NORTHWEST QUADRANT	202 KNOX	OVERFLOW CAUSING EXCURSION	BUFFALO BAYOU	492-L	TX0063002	16-May-00	05:55	1515	Gallons
NORTHWEST QUADRANT	1719 OVID	SERVICE LINE STOPPED UP	BUFFALO BAYOU	493-F	TX0096172	16-May-00	07:48	1698	Gallons
NORTHWEST	3311 BEAUCAMP	MAIN LINE OVER FLOWING	BUFFALO BAYOU	493-B	TX0096172	16-May-00	14:25	4860	Gallons
NORTHWEST	401 STUDEWOOD	MAIN LINE OVER FLOWING	BUFFALO BAYOU	493-H	TX0096172	16-May-00	01:50	277	Gallons
NORTHEAST QUADS	604 W. 11TH	SEWER LINE STOPPED UP	BUFFALO BAYOU	453-W	TX0096172	17-May-00	12:27	830	Gallons
NORTHEAST QUAD	4008 ROTMAN	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-P	TX0096172	17-May-00	9:48	1205	Gallons
NORTHWEST QUADRANT	QUADRANT	ROUTINE STOPPAGE	BUFFALO BAYOU	450-M	TX0096172	18-May-00	09:38	339	Gallons
NORTHEAST QUAD	1406 JAMES	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-H	TX0096172	19-May-00	10:34	184	Gallons
NORTHWEST QUAD	3317 BEAUCHAMP	SEWER MAIN STOPPED UP	BUFFALO BAYOU	493-B	TX0096172	19-May-00	13:26	114	Gallons
NORTHWEST QUADRANT	83 LEGEND	MAIN LINE STOPPED UP	BUFFALO BAYOU	489-M	TX0096172	19-May-00	13:00	256	Gallons
NORTHWEST QUADRANT	3917 SAN FELIPE	ROUTINE STOPPAGE.	BUFFALO BAYOU	492-N	TX0096172	22-May-00	13:50	800	Gallons
NORTHEAST QUAD	311 N. YORK ST.	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-N	TX0096172	22-May-00	09:31	151	Gallons
SOUTHWEST QUADRANT	1114 BRIAR BAYOU DR.	ROUTINE STOPPAGE	BUFFALO BAYOU	488-L	TX0096172	22-May-00	10:09	393	Gallons
NORTHWEST QUADRANT	4295 SAN FELIPE	SERVICE LINE STOPPED UP	BUFFALO BAYOU	491-R	TX0096172	22-May-00	13:40	2320	Gallons
SOUTHEAST QUAD	2304 TRUXILLO	OVERFLOW STOPPAGE DUE TO NEEDED REPAIR	BUFFALO BAYOU	493-Y	TX0096172	22-May-00	14:54	2976	Gallons
NORTHWEST QUAD	800 N. DURHAM	PRIVATE LINE STOPPED UP	BUFFALO BAYOU	492-C	TX0096172	23-May-00	13:55	120	Gallons
NORTHEAST QUADRANT	1119 ALTIC	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-T	TX0096172	23-May-00	14:16	28	Gallons
NORTHWEST QUADRANT	3923 SAN FELIPE	SEWER MAIN STOPPED UP	BUFFALO BAYOU	492-N	TX0096172	23-May-00	13:33	1041	Gallons
NORTHEAST QUAD	1101 YORK	SERVICE LINE STOPPED UP	BUFFALO BAYOU	494-S	TX0096172	23-May-00	10:36	1520	Gallons
NORTHEAST QUAD	EASTWOOD AT HARBY	MAIN LINE STOPPED UP CAUSING MANHOLE OVERFLOWING	BUFFALO BAYOU	494-W	TX0096172	23-May-00	14:10	6600	Gallons
SOUTHWEST QUADRANT	3524 MEADWAY	MAIN LINE STOPPED UP	BUFFALO BAYOU	488-Z	TX0035017	24-May-00	10:16	660	Gallons

Problem	Location	Description	Receiving stream	Key map	Permit	Date	Time	Volume	Unit
SOUTHWEST QUAD	4010 WOODHEAD	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-V	TX0096172	24-May-00	08:17	412	Gallons
NORTHEAST QUAD	900 ALTIC	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-U	TX0096172	24-May-00	10:07	5940	Gallons
NORTHEAST QUADRANT	10818 BAUMAN	MAIN LINE STOPPED UP	BUFFALO BAYOU	413-Y	TX0096172	24-May-00	10:34	64	Gallons
NORTHEAST QUAD	1200 SIDNEY	CITY MAIN STOPPED UP	BUFFALO BAYOU	494-S	TX0096172	24-May-00	19:30	1096	Gallons
SOUTHEAST QUADRANT	3311 BEAUCHAMP	SEWER MAIN STOPPED UP	BUFFALO BAYOU	493-B	TX0096172	24-May-00	9:36	1412	Gallons
NORTHEAST QUAD	1317 TELEPHONE	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-X	TX0096172	25-May-00	09:50	462	Gallons
NORTHWEST QUADS	4418 ROEHLER	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-N	TX0096172	25-May-00	13:23	168	Gallons
NORTHEAST QUAD	7810 KATY FRWY	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-B	TX0096172	25-May-00	14:15	375	Gallons
NORTHEAST QUADRANT	2921 BRINGHURST	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-B	TX0096172	25-May-00	11:15	6000	Gallons
NORTHEAST QUADRANT	1612 CHESTNUT	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-H	TX0096172	26-May-00	10:24	312	Gallons
NORTHEAST QUAD	12 STILES ST	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-P	TX0096172	26-May-00	08:31	285	Gallons
NORTHEAST QUAD	6742 AVENUE O	OVERFLOW FROM PRIVATE LINE	BUFFALO BAYOU	494-R	TX0096172	26-May-00	15:47	13	Gallons
SOUTHEAST QUADS	3715 N. MACGREGOR	MAIN LINE STOPPED UP	BUFFALO BAYOU	533-H	TX0096172	26-May-00	22:58	694	Gallons
SOUTHWEST QUADRANT	1757 BRANARD	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-V	TX0063002	28-May-00	07:37	932	Gallons
NORTHWEST QUADRANT	8723 KATY FREEWAY	CITY MAIN STOPPED UP GOING INTO STORM SEWER	BUFFALO BAYOU	490-B	TX0063002	30-May-00	17:05	530	Gallons
SOUTHEAST QUADRANT	2400 NAVIGATION	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-J	TX0096172	30-May-00	12:11	362	Gallons
NORTHEAST QUADRANT	2514 SUMPTER	SERVICE LINE STOPPED UP	BUFFALO BAYOU	494-E	TX0096172	31-May-00	09:00	1096	Gallons
SOUTHEAST QUADRANT	5649 BARRYMORE	MAIN LINE STOPPED UP	BUFFALO BAYOU	534-C	TX0096172	31-May-00	10:02	440	Gallons
N/A	TURKEY CREEK WWTP	FAILURE OF ON SITE TRANSFORMER CAUSED A POWER FAILURE	BUFFALO BAYOU	488-G	TX0035017	31-May-00	08:44		
NORTHWEST QUADS	803 SANDMAN	ROUTINE STOPPAGE	BUFFALO BAYOU	492-G	TX0096172	03-Jun-00	08:48	650	Gallons
NORTHEAST QUADRANT	4445 MCKINNEY ST.	MAIN LINE STOPPED UP	BUFFALO BAYOU	949-T	TX0096172	03-Jun-00	15:06	2318	Gallons
SOUTHWEST QUAD	3131 SOUTHWEST FRWY	ROUTINE STOPPAGE CAUSED BY GREASE	BUFFALO BAYOU	492-X	TX0096172	04-Jun-00	11:52	1330	Gallons
SOUTHWEST QUAD	1745 LEXINGTON	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-Z	TX0062995	05-Jun-00	15:10	140	Gallons
SOUTHWEST QUAD	5441 JUDALON	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-Y	TX0063002	05-Jun-00	10:40	170	Gallons
NORTHEAST QUAD	5000 JEFFERSON	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-X	TX0096172	05-Jun-00	10:14	1115	Gallons
NORTHEAST QUAD	4940 WALKER @ LENOX	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-T	TX0096172	06-Jun-00	12:15	387	Gallons
NORTHEAST QUAD	7103 PALASTINE	SERVICE LINE STOPPED UP	BUFFALO BAYOU	494-M	TX0096172	06-Jun-00	17:53	2859	Gallons
NORTHEAST QUAD	7025 CANAL	SERVICE LINE STOPPED UP	BUFFALO BAYOU	494-V	TX0096172	06-Jun-00	19:00	2490	Gallons
NORTHEAST QUADS	103 BEDFORD	MAIN LINE STOPPAGE	BUFFALO BAYOU	495-U	TX0096172	08-Jun-00	16:59	231	Gallons
NORTHWEST QUADRANT	1344 ALEXANDER	MAIN LINE STOPPAGE	BUFFALO BAYOU	452-F	TX0096172	09-Jun-00	12:20	80	Gallons
SOUTHWEST QUADS	ALTIC & TEXAS ST	ROUTINE STOPPAGE	BUFFALO BAYOU	494-U	TX0096172	09-Jun-00	10:26	177	Gallons
NORTHEAST QUAD	7500 MARKET ST	ROUTINE STOPPAGE CAUSED BY GREASE	BUFFALO BAYOU	495-E	TX0096172	10-Jun-00	21:50	3900	Gallons
SOUTHEAST QUAD	1313 STANFORD	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-N	TX0096172	12-Jun-00	10:19	188	Gallons
NORTHEAST QUADRANT	11 NORWOOD ST.	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-U	TX0096172	12-Jun-00	12:05	162	Gallons
NORTHWEST QUAD	1600 POST OAK BLVD.	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-K	TX0096172	12-Jun-00	14:22	2386	Gallons
SOUTHWEST QUAD	1743 PORTMOUTH	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-Z	TX0096172	12-Jun-00	02:50	619	Gallons
SOUTHWEST QUAD	3050 POST OAK BLVD.	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-Y	TX0096172	14-Jun-00	11:16	582	Gallons
SOUTHEAST QUAD	4701 BELL	SEWER LINE STOPPED UP	BUFFALO BAYOU	494-X	TX0096172	15-Jun-00	12:46	240	Gallons
SOUTHEAST QUAD	GRAUSTARK @ HAWTHORNE	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-S	TX0096172	15-Jun-00	14:45	500	Gallons
NORTHWEST QUAD	2108 AMBERLY CT.	MAIN LINE STOPPED UP	BUFFALO BAYOU	490-R	TX0096172	19-Jun-00	10:13	1200	Gallons
NORTHEAST QUAD	4309 HARBY	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-W	TX0096172	19-Jun-00	11:49	60	Gallons
NORTHEAST QUAD	4707 BELL	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-X	TX0096172	20-Jun-00	08:07	819	Gallons
NORTHWEST QUAD	113 MILAM ST.	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-B	TX00961721	20-Jun-00	08:33	605	Gallons
NORTHEAST QUAD	5219 TREMPER	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-G	TX0096172	21-Jun-00	09:16	43	Gallons
SOUTHEAST QUAD	2608 STANFORD	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-N	TX0096172	21-Jun-00	11:16	144	Gallons
NORTHWEST QUAD	4000 W. 34TH STREET	MAIN LINE STOPPED UP	BUFFALO BAYOU	451-R	TX0096172	21-Jun-00	10:11	1030	Gallons
NORTHEAST QUAD	7118 EL PASO ST.	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-H	TX0096172	21-Jun-00	11:02	185.5	Gallons
SOUTHEAST QUAD	1400 RUTHUEN	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-P	TX0096172	21-Jun-00	10:11	2376	Gallons
SOUTHEAST QUAD	3511 HILLCROFT	MAIN LINE STOPPED UP	BUFFALO BAYOU	490-Z	TX0096172	23-Jun-00	08:17	815	Gallons
NORTHWEST QUAD	404 E. 43RD ST.	MAIN LINE STOPPED UP	BUFFALO BAYOU	453-J	TX0096172	23-Jun-00	11:15	90	Gallons
NORTHWEST QUAD	2050 NORTH LOOP	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-Z	TX0096172	24-Jun-00	08:00	2250	Gallons
SOUTHWEST QUAD	1219 EDWARDS	COMMUNITY LINE STOPPED UP	BUFFALO BAYOU	493-G	TX0096172	24-Jun-00	14:24	180	Gallons
NORTHWEST QUAD	9801 MEADOWGLEN	MAIN LINE STOPPED UP	BUFFALO BAYOU	490-W	TX0063002	25-Jun-00	17:45	6280	Gallons
NORTHEAST QUAD	4123 LIBERTY	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-B	TX0096172	26-Jun-00	12:36	152	Gallons
NORTHEAST QUAD	2803 RUSSELL	ROUTINE STOPPAGE	BUFFALO BAYOU	494-B	TX0096172	26-Jun-00	13:38	328	Gallons
NORTHEAST QUAD	211 KRESS ST.	SERVICE LINE STOPPED UP	BUFFALO BAYOU	494-D	TX0096172	27-Jun-00	17:28	104	Gallons
NORTHEAST QUAD	600 YORK	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-P	TX0096172	27-Jun-00	14:25	600	Gallons
SOUTHWEST QUAD	7819 HIGHMEADOW DR.	MAIN LINE STOPPAGE	BUFFALO BAYOU	490-V	TX0063002	29-Jun-00	17:11	240	Gallons
NORTHEAST QUAD	4701 BELL	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-X	TX0096172	29-Jun-00	13:14	265	Gallons
NORTHWEST QUAD	3407 LANG	REPAIR PENDING ON PARTS SEWER LEAKING INTO BAYOU	BUFFALO BAYOU	451-J	TX0096172	29-Jun-00	09:46		Gallons
SOUTHEAST QUAD	3102 LIBERTY	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-A	TX0096172	29-Jun-00	10:35	278	Gallons
NORTHWEST QUAD	11404 OLD KATY RD.	MAIN LINE STOPPED UP	BUFFALO BAYOU	489-B	TX0096172	30-Jun-00	08:20	575	Gallons
NORTHEAST QUAD	909 WOODING	STOPPAGE IN MAIN LINE	BUFFALO BAYOU	494-V	TX0096172	01-Jul-00	10:59	188	Gallons
N/A	2525 MACARIO GARCIA	POWER FAILURE AT PLANT	BUFFALO BAYOU	494-R	TX0096172	03-Jul-00	09:25		Gallons
NORTHEAST QUAD	2509 EVERETT	COMMUNITY LINE STOPPED UP	BUFFALO BAYOU	493-C	TX0096172	03-Jul-00	13:05	345	Gallons
SOUTHWEST QUAD	790 BATEWOOD	MAIN LINE STOPPED UP	BUFFALO BAYOU	489-E	TX0096172	03-Jul-00	11:26	3672	Gallons
NORTHWEST QUAD	1811 RUIZ	STOPPAGE IN MAIN LINE	BUFFALO BAYOU	493-M	TX0096172	05-Jul-00	16:15	795	Gallons
NORTHWEST QUAD	5854 SAN FELIPE	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-P	TX0096172	05-Jul-00	19:10	9650	Gallons
NORTHEAST QUAD	1143 HAHLO ST.	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-M	TX0096172	06-Jul-00	08:21	50	Gallons
SOUTHWEST QUAD	1747 PORTSMOUTH	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-Z	TX0096172	06-Jul-00	15:00	133	Gallons
SOUTHWEST QUAD	112 1/2 TRAVIS	SERVICE LINE STOPPED UP	BUFFALO BAYOU	493-L	TX0096172	07-Jul-00	11:44	565	Gallons
NORTHWEST QUAD	138 VICTORIA	MAIN LINE STOPPED UP	BUFFALO BAYOU	452-H	TX0096172	07-Jul-00	16:17	4344	Gallons
SOUTHEAST QUAD	419 TRAVIS	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-L	TX0096177	07-Jul-00	16:29	728	Gallons
NORTHEAST QUAD	10401 JENSEN DR.	MAIN LINE STOPPED UP	BUFFALO BAYOU	414-X	TX0096172	08-Jul-00	21:05	3325	Gallons
NORTHWEST QUAD	15 GLEN OAK ST.	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-C	TX0096172	08-Jul-00	06:40	1260	Gallons
NORTHEAST QUAD	2915 BRINGHURST	COMMUNITY LINE STOPPED UP	BUFFALO BAYOU	494-B	TX0096172	09-Jul-00	15:50	125	Gallons
SOUTHWEST QUAD	14600 BRAMBLEWOOD	MAIN LINE STOPPED UP	BUFFALO BAYOU	488-M	TX0035017	10-Jul-00	19:48	38100	Gallons
N/A	14600 BRAMBLEWOOD	HARRIS COUNTY PCT.3 PARKS DEPT. WAS EXCAVATING AND HIT	BUFFALO BAYOU	488-M	TX0035017	10-Jul-00	20:00	55000	Gallons
NORTHWEST QUAD	1811 RUIZ ST.	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-M	TX0096172	11-Jul-00	7:50	650	Gallons
SOUTHWEST QUADS	3003 WINDCHASE	MAIN LINE STOPPED UP	BUFFALO BAYOU	488-X	TX0063002	12-Jul-00	13:55	600	Gallons
SOUTHWEST QUAD	1605 RUTH	ROUTINE STOPPAGE	BUFFALO BAYOU	493-X	TX0096172	14-Jul-00	15:00	1087	Gallons
NORTHEAST QUAD	4328 LEELAND	SERVICE LINE STOPPED UP	BUFFALO BAYOU	494-S	TX0096172	14-Jul-00	07:30		
NORTHEAST QUAD	4401 AVERILL	MAIN LINE STOPPED UP	BUFFALO BAYOU	453-Y	TX0096172	15-Jul-00	20:27	1488	Gallons
SOUTHWEST QUAD	5320 DORA	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-W	TX0096172	18-Jul-00	08:18	75	Gallons

Problem	Location	Description	Receiving stream	Key map	Permit	Date	Time	Volume	Unit
SOUTHWEST QUAD	3218 ROCK RILL	MAIN LINE STOPPED UP		572-F	TX0034924	19-Jul-00	17:28	272	Gallons
NORTHWEST QUAD	1300 WILCREST	8X8 ROUTINE STOPPAGE	BUFFALO BAYOU	489-P	TX0063002	19-Jul-00	09:50	255	Gallons
SOUTHEAST QUAD	1430 CAYWOOD	MAIN LINE STOPPED UP	BUFFALO BAYOU	451-X	TX0096172	19-Jul-00	10:30	260	Gallons
SOUTHEAST QUAD	4906 CHENEVERT	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-X	TX0096172	21-Jul-00	09:22	340	Gallons
NORTHWEST QUAD	11113 KATY FRWY. - BEHIND LAQU	MAIN LINE STOPPED UP	BUFFALO BAYOU	489-B	TX0096172	22-Jul-00	11:15	27282	Gallons
NORTHEAST QUAD	610 S. WAYSIDE DR.	LINE SOPPED UP	BUFFALO BAYOU	494-V	TX0096172	26-Jul-00	09:24	243	Gallons
NORTHEAST QUAD	2003 MAFFITT	COMMUNITY LINE STOPPED UP	BUFFALO BAYOU	493-H	TX0096172	26-Jul-00	12:51	232.5	Gallons
SOUTHWEST QUADRANT	5647 WESTHEIMER	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-T	TX0096172	27-Jul-00	9:50	388	Gallons
SOUTHEAST QUADRANT	302 LENOX	MAIN LINE STOPPAGE	BUFFALO BAYOU	494-U	TX0096172	28-Jul-00	15:07	252	Gallons
NORTHWEST QUAD	2210 W. DALLAS	ROUTINE STOPPAGE	BUFFALO BAYOU	493-R	TX0096172	28-Jul-00	12:10	280	Gallons
SOUTHWEST QUAD	3409 LABRANCH	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-T	TX0096172	28-Jul-00	12:16	477	Gallons
NORTHEAST QUAD	1504 LUZON	STOPPAGE IN MAIN LINE	BUFFALO BAYOU	493-D	TX0096172	29-Jul-00	09:11	290	Gallons
NORTHEAST QUAD	246 MCCARTHY DR.	MAIN LINE AND SEWER LINE STOPPED UP	BUFFALO BAYOU	495-B	TX0096172	29-Jul-00	12:26	14630	Gallons
NORTHWEST QUAD	701 USENER	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-B	TX0096172	30-Jul-00	15:15	720	Gallons
NORTHEAST QUAD	4322 LEELAND	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-S	TX0096172	30-Jul-00	11:27	471	Gallons
SOUTHWEST QUAD	2100 AMBERLY	MAIN LINE STOPPED UP DUE TO LIFT STATION	BUFFALO BAYOU	490-R	TX0096172	31-Jul-00	10:14	890	Gallons
SOUTHWEST QUAD	6227 SOUTHWEST FRWY	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-X	TX0096172	01-Aug-00	01:20	710	Gallons
N/A	243 MCCARTY	BREAK IN FORCE MAIN SOME TYPE OF OIL COMING INTO WET WE	BUFFALO BAYOU	495-B	TX0096172	01-Aug-00	11:30	2225	Gallons
NORTHEAST QUAD	2828 COLLINGSWORTH	MAIN LINE STOPPED UP	BUFFALO BAYOU	454-W	TX0035017	02-Aug-00	15:18	216	Gallons
NORTHWEST QUAD	8210 BAUMAN	MAIN LINE STOPPED UP	BUFFALO BAYOU	453-G	TX0096172	02-Aug-00	08:42	930	Gallons
NORTHEAST QUAD	4409 BEGGS	SERVICE LINE STOPPED UP	BUFFALO BAYOU	453-Y	TX0096172	02-Aug-00	09:50	372	Gallons
SOUTHEAST QUAD	4423 CANAL	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-P	TX0096172	03-Aug-00	14:20	320	Gallons
SOUTHEAST QUAD	5647 WESTHEIMER RD.	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-T	TX0096172	03-Aug-00	11:25	1430	Gallons
SOUTHEAST QUAD	1206 EDDINGTON	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-T	TX0096172	05-Aug-00	12:44	297	Gallons
SOUTHWEST QUAD	2110 GLENKNOLL	MAIN LINE STOPPED UP	BUFFALO BAYOU	489-P		08-Aug-00	16:05	2400	Gallons
NORTHWEST QUAD	8211 KINGSBROOK	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-B	TX0096172	08-Aug-00	10:55	322	Gallons
NORTHEAST QUAD	2311 NOBLE	SERVICE LINE STOPPED UP	BUFFALO BAYOU	494-A	TX0096172	08-Aug-00	17:37	126	Gallons
SOUTHWEST QUAD	1401 CASTLE COURT	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-W	TX0096172	08-Aug-00	11:34	1835	Gallons
SOUTHWEST QUAD	3123 WESTWICK DR.	MAIN LINE STOPPED UP	BUFFALO BAYOU	488-Z	TX0035017	09-Aug-00	11:58	284	Gallons
SOUTHWEST QUAD	4126 SOUTHWEST FRWY	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-Z	TX0062995	09-Aug-00	10:06	1390	Gallons
SOUTHEAST QUAD	403 COWLING ST.	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-U	TX0096172	09-Aug-00	18:00	190	Gallons
NORTHWEST QUAD	1010 W. WEBSTER AVE.	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-P	TX0096172	09-Aug-00	09:49	244	Gallons
SOUTHEAST QUAD	5440 SUGARHILL	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-L	TX0093172	12-Aug-00	14:10	155	Gallons
NORTHWEST QUAD	1113 KATY FRWY.	SEWER MAIN LINE STOPPED UP	BUFFALO BAYOU	489-B	TX0096172	14-Aug-00	12:15	180	Gallons
NORTHWEST QUAD	5201 MEMORIAL	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-L	TX0096172	15-Aug-00	09:14	320	Gallons
NORTHEAST QUAD	7211 HARRISBURG	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-Z	TX0096172	16-Aug-00	12:25	625	Gallons
NORTHWEST QUAD	11757 KATY FRWY.	SEWER MAIN STOPPED UP	BUFFALO BAYOU	488-D	TX0063002	17-Aug-00	10:17	1065	Gallons
SOUTHEAST QUAD	3809 MAIN & TRUXILLO	MAIN LINE STOPPAGE	BUFFALO BAYOU	493-T	TX0096172	19-Aug-00	09:40	909	Gallons
SOUTHEAST QUAD	317 S. 72ND ST.	ROUTINE STOPPAGE	BUFFALO BAYOU	494-Z	TX0096172	19-Aug-00	12:06	244	Gallons
SOUTHEAST QUAD	2001 JEFFERSON ST.	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-U	TX0096172	20-Aug-00	17:39	2565	Gallons
NORTHWEST QUAD	1811 RUIZ	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-M	TX0096172	21-Aug-00	14:05	565	Gallons
NORTHWEST QUAD	11113 KATY FRWY	MAIN LINE STOPPED UP	BUFFALO BAYOU	489-A	TX0096172	21-Aug-00	18:59	705	Gallons
SOUTHEAST QUAD	1806 SUNNYLAND	MAIN LINE STOPPED UP	BUFFALO BAYOU	534-C	TX0096172	22-Aug-00	10:11	10000	Gallons
NORTHWEST QUAD	1500 ANDREW ST.	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-P	TX0096172	25-Aug-00	11:48	42	Gallons
SOUTHEAST QUAD	600 COLUMBIA	SERVICE LINE STOPPED UP	BUFFALO BAYOU	493-A	TX0096172	25-Aug-00	13:10	460	Gallons
SOUTHEAST QUAD	4704 PEASE ST.	SERVICE & MAIN LINE STOPPED UP	BUFFALO BAYOU	494-Y	TX0096172	25-Aug-00	09:10	4200	Gallons
SOUTHEAST QUAD	4609 MARKET	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-F	TX0096172	25-Aug-00	13:45	1210	Gallons
NORTHEAST QUAD	4604 E. FRWY	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-F	TX0096172	25-Aug-00	13:45	1301	Gallons
SOUTHEAST QUAD	4701 BELL	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-X	TX0096172	26-Aug-00	08:33	34	Gallons
SOUTHEAST QUAD	13 S. WEST OAK DR.	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-L	TX0096172	28-Aug-00	11:55	375	Gallons
NORTHWEST QUAD	10027 WESTVIEW	CITY MAIN STOPPED UP	BUFFALO BAYOU	450-W	TX0096172	28-Aug-00	16:12	506	Gallons
SOUTHEAST QUAD	1420 GOLIAD	MAIN LINE AND SERVICE LINE HOLDING	BUFFALO BAYOU	493-G	TX0096172	28-Aug-00	13:15	150	Gallons
SOUTHEAST QUAD	3022 ROSALIE	COMMUNITY LINE STOPPED UP	BUFFALO BAYOU	493-Z	TX0096172	29-Aug-00	12:15	156	Gallons
NORTHWEST QUAD	2300 WILCREST	MAIN LINE STOPPED UP	BUFFALO BAYOU	489-T	TX0063002	02-Sep-00	17:29	60	Gallons
NORTHWEST QUAD	547 KICKERILLO	SERVICE LINE OVERFLOWING	BUFFALO BAYOU	488-M	TX0035017	04-Sep-00	14:30	873	Gallons
SOUTHEAST QUAD	2810 BERRY	MAIN LINE STOPPED UP	BUFFALO BAYOU	454-E	TX0096172	07-Sep-00	11:01	61	Gallons
SOUTHWEST QUAD	12827 SKYKNOLL	MAIN LINE STOPPED UP	BUFFALO BAYOU	488-Y	TX0035017	08-Sep-00	12:33	14785	Gallons
SOUTHWEST QUAD	2222 W. LOOP S	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-V	TX0063002	12-Sep-00	10:18	1920	Gallons
NORTHWEST QUAD	5175 HACKLEBERRY CIRCLE	MAIN & SERVICE STOPPED UP	BUFFALO BAYOU	491-Q	TX0096172	12-Sep-00	11:25	216	Gallons
NORTHWEST QUADRANT	1510 COLQUITT	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-V	TX0063002	15-Sep-00	10:46	680	Gallons
NORTHWEST QUADRANT	11113 KATY FREEWAY	MAIN LINE STOPPED UP	BUFFALO BAYOU	489-A	TX0063002	15-Sep-00	10:18	468	Gallons
SOUTHEAST QUADRANT	5175 HUCKLEBERRY	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-Q	TX0096172	15-Sep-00	13:45	110	Gallons
SOUTHEAST QUADRANT	600 WACO	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-K	TX0096172	16-Sep-00	13:11	320	Gallons
SOUTHEAST QUAD	7720 GREENWOOD	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-V	TX0096172	16-Sep-00	18:35	1940	Gallons
NORTHWEST QUAD	1714 HULDY	SERVICE LINE HOLDING	BUFFALO BAYOU	492-R	TX0096172	18-Sep-00	14:47	113	Gallons
SOUTHWEST QUAD	2824 BRIARHURST	SERVICE LINE STOPPED UP	BUFFALO BAYOU	491-S	TX0096172	18-Sep-00	12:04	262	Gallons
NORTHWEST QUAD	1100 POST OAK BLVD.	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-K	TX0096172	19-Sep-00	10:40	35	Gallons
SOUTHEAST QUADRANT	1800 DISMUKE	MAIN LINE STOPPED UP	BUFFALO BAYOU	534-C	TX0096172	19-Sep-00	10:20	1227	Gallons
SOUTHWEST QUAD	13858 BEECH HOLLOW LN.	MAIN LINE STOPPAGE	BUFFALO BAYOU	488-X	TX0035017	20-Sep-00	09:15	1025	Gallons
NORTHEAST QUAD	4630 CLAY	MAIN LINE & SERVICE LINE STOPPED UP	BUFFALO BAYOU	494-T	TX0096172	20-Sep-00	11:27	534	Gallons
NORTHWEST QUAD	1300 WILCREST	MAIN LINE STOPPED UP	BUFFALO BAYOU	489-P	TX0063002	21-Sep-00	11:50	174	Gallons
SOUTHEAST QUADRANT	COLDSTREAM @ SHAVELSON	SEWER MAIN STOPPED UP	BUFFALO BAYOU	491-C	TX0096172	21-Sep-00	11:15	387	Gallons
NORTHEAST QUADRANT	211 N. BRYAN	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-P	TX0096172	23-Sep-00	17:21	796	Gallons
NORTHEAST QUAD	WOODLEIGH @ SIDNEY	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-S	TX0096172	25-Sep-00	14:22	1065	Gallons
SOUTHEAST QUAD	1755 COLQUITT	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-Z	TX0096172	25-Sep-00	16:31	4985	Gallons
SOUTHWEST QUAD	3271 SUL ROSS	MAIN STOPPED UP	BUFFALO BAYOU	492-T	TX0096172	26-Sep-00	08:38	88	Gallons
NORTHEAST QUAD	PRESTON @ HUTCHESON	MAIN STOPPED UP	BUFFALO BAYOU	494-N	TX0096172	26-Sep-00	08:30	350	Gallons
SOUTHEAST QUAD	925 N. WILCREST	MAIN LINE STOPPED UP	BUFFALO BAYOU	489-B	TX0096172	26-Sep-00	12:30	130	Gallons
SOUTHEAST QUAD	3201 DOWLING	SERVICE LINE STOPPED UP	BUFFALO BAYOU	493-Y	TX0096172	26-Sep-00	16:08	1536	Gallons
NORTHWEST QUAD	1714 HULDY	MAIN LINE STOPPAGE	BUFFALO BAYOU	492-Q	TX0096172	27-Sep-00	13:25	110	Gallons
NORTHWEST QUAD	1714 HULDY	SEWER MAIN & SERVICE STOPPED UP	BUFFALO BAYOU	492-Q	TX0096172	27-Sep-00	14:57	164	Gallons
SOUTHEAST QUAD	3437 JEFFERSON	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-V	TX0096172	27-Sep-00	12:40	104	Gallons
SOUTHEAST QUAD	4423 CANAL	MAIN LINE STOPPED UP CAUSING OVERFLOW	BUFFALO BAYOU	494-P	TX0096172	28-Sep-00	16:40	22	Gallons

Problem	Location	Description	Receiving stream	Key map	Permit	Date	Time	Volume	Unit
NORTHWEST QUAD	5085 FIELDWOOD	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-Q	TX0096172	29-Sep-00	13:10	55	Gallons
NORTHWEST QUADRANT	500 LAMAR	OVER FLOW FROM SAMPLE WELL CAUSEING EXCURSION	BUFFALO BAYOU	493-L	TX0096172	29-Sep-00	17:49	72	Gallons
NORTHEAST QUAD	4616 NICHOL	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-B	TX0096172	02-Oct-00	06:01	162	Gallons
NORTHEAST QUAD	4402 WALKER	MAIN STOPPED UP	BUFFALO BAYOU	494-T	TX0096172	02-Oct-00	09:56	2106	Gallons
NORTHEAST QUAD	118 NAGLE	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-N	TX0096172	02-Oct-00	09:35	4470	Gallons
NORTHEAST QUAD	1413 ELLIOTT	MAIN STOPPED UP	BUFFALO BAYOU	494-X	TX0096172	03-Oct-00	18:46	129	Gallons
SOUTHWEST QUAD	2606 S. SHEPHERD	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-U	TX0096172	04-Oct-00	08:41	670	Gallons
NORTHEAST QUAD	5914 HARRISBURG	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-U	TX0096172	05-Oct-00	17:20	1290	Gallons
NORTHEAST QUAD	6626 SHERMAN	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-V	TX0096172	07-Oct-00	22:16	205	Gallons
NORTHEAST QUAD	215 MILBY	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-P	TX0096172	09-Oct-00	09:00	2874	Gallons
SOUTHEAST QUAD	6111 DEL RIO	MAIN LINE STOPPED UP	BUFFALO BAYOU	533-G	TX0096172	10-Oct-00	07:33	45050	Gallons
SOUTHWEST QUAD	3412 CRAWFORD	LINE STOPPED UP WITH GREASE	BUFFALO BAYOU	493-T	TX0096172	11-Oct-00	08:45	250	Gallons
SOUTHEAST QUAD	5642 BRIAR DR.	MAIN STOPPED UP	BUFFALO BAYOU	491-F	TX0096172	11-Oct-00	12:30	150	Gallons
NORTHEAST QUAD	WACO @ SANDICK	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-F	TX0096172	11-Oct-00	09:35	1470	Gallons
NORTHEAST QUAD	5602 LYONS AV.	SERVICE LINE HOLDING	BUFFALO BAYOU	494-G	TX0035106	12-Oct-00	08:40	195	Gallons
NORTHEAST QUAD	6600 NERDLING	SEWER MAIN STOPPED UP	BUFFALO BAYOU	413-W	TX0096172	12-Oct-00	10:53	120	Gallons
NORTHEAST QUAD	7000 NAVIGATION	ROUTINE STOPPAGE	BUFFALO BAYOU	494-V	TX0096172	12-Oct-00	11:55	205	Gallons
NORTHWEST QUAD	3540 W. DALLAS	MAIN LINE HAD STOPPAGE	BUFFALO BAYOU	492-M	TX0096172	12-Oct-00	08:45	590	Gallons
NORTHEAST QUAD	912 PRESS ST.	BROKEN MAIN LINE	BUFFALO BAYOU	494-F	TX0096172	14-Oct-00	10:00	918.5	Gallons
NORTHWEST QUAD	4020 MEADOWLAKE LANE	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-N	TX0096172	15-Oct-00	08:50	500	Gallons
SOUTHEAST QUAD	2812 WICHITA	SERVICE LINE STOPPED UP	BUFFALO BAYOU	533-C	TX0096172	15-Oct-00	08:26	4692	Gallons
NORTHEAST QUAD	211 N. BRYAN	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-P	TX0096172	16-Oct-00	14:30	250	Gallons
SOUTHWEST QUAD	3262 BRANARD	SERVICE LINE STOPPED UP	BUFFALO BAYOU	492-T	TX0096172	16-Oct-00	09:30	1500	Gallons
NORTHEAST QUAD	1719 BOUNDARY	COMMUNITY LINE STOPPED UP	BUFFALO BAYOU	493-C	TX0096172	16-Oct-00	08:40	620	Gallons
NORTHWEST QUAD	626 OMAR	SERVICE LINE STOPPED UP	BUFFALO BAYOU	493-B	TX0096172	17-Oct-00	11:21	820	Gallons
SOUTHEAST QUAD	4530 WALKER	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-T	TX0096172	18-Oct-00	09:45	540	Gallons
NORTHWEST QUAD	3371 CHEVY CHASE	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-P	TX0096172	18-Oct-00	10:48	1527	Gallons
NORTHEAST QUAD	950 VILLA DE MATEL	MAIN LINE STOPPAGE	BUFFALO BAYOU	494-Y	TX0096172	19-Oct-00	18:13	994	Gallons
NORTHEAST QUAD	EASTWOOD AT HARDY	MAIN LINE HAS STOPPAGE	BUFFALO BAYOU	494-W	TX0096172	19-Oct-00	08:26	264	Gallons
NORTHEAST QUAD	4732 RUSK	MANHOLE OVERFLOWING	BUFFALO BAYOU	494-T	TX0096172	20-Oct-00	12:40	94	Gallons
SOUTHWEST QUAD	6000 RICHMOND AVE.	MAIN AND SERVICE LINE STOPPED UP	BUFFALO BAYOU	491-X	TX0096172	21-Oct-00	13:55	110	Gallons
NORTHWEST QUAD	916 SNOVER	COMMUNITY LINE	BUFFALO BAYOU	492-H	TX0096172	21-Oct-00	04:34	1474	Gallons
SOUTHWEST QUAD	2606 SHEPHERD	STOPPAGE IN MAIN LINE	BUFFALO BAYOU	492-U	TX0096172	21-Oct-00	21:03	369.5	Gallons
SOUTHEAST QUAD	1400 LUBBOCK	SERVICE LINE STOPPED UP	BUFFALO BAYOU	493-K	TX0096172	24-Oct-00	16:50	645	Gallons
NORTHEAST QUAD	4220 WOODLEIGH	ROUTINE STOPPAGE	BUFFALO BAYOU	494-S	TX0096172	24-Oct-00	17:25	1324	Gallons
NORTHEAST QUAD	7006 AVENUE C	STOPPAGE IN MAIN LINE	BUFFALO BAYOU	494-V	TX0096172	24-Oct-00	10:11	720	Gallons
NORTHEAST QUAD	211 BRYAN	MAIN AND SERVICE LINE HOLDING	BUFFALO BAYOU	494-P	TX0096172	24-Oct-00	09:45	263	Gallons
SOUTHEAST QUAD	2222 W. LOOP FREEWAY	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-V	TX0096172	25-Oct-00	14:25	2460	Gallons
NORTHEAST QUAD	7118 TUCK	MAIN LINE HAD STOPPAGE	BUFFALO BAYOU	494-N	TX0096172	25-Oct-00	19:50	725	Gallons
NORTHWEST QUAD	1516 ALAMO	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-F	TX0096172	26-Oct-00	10:27	204	Gallons
NORTHEAST QUAD	7415 EL PASO	MAIN LINE STOPPED UP	BUFFALO BAYOU	495-E	TX0096172	26-Oct-00	12:03	137	Gallons
NORTHWEST QUAD	5238 CEDAR CREEK	MAIN LINE STOPPAGE	BUFFALO BAYOU	491-Q	TX0096172	26-Oct-00	14:30	675	Gallons
NORTHEAST QUAD	COSTA RICA @ LA MONTE	ROUTINE STOPPAGE	BUFFALO BAYOU	451-L	TX0096172	26-Oct-00	15:25	78	Gallons
SOUTHEAST QUAD	1510 COLQUITT	MAIN LINE AND SERVICE LINE STOPPED UP	BUFFALO BAYOU	492-V	TX0096172	27-Oct-00	08:14	740	Gallons
NORTHEAST QUAD	5820 GANO	MAIN LINE STOPPED UP	BUFFALO BAYOU	453-B	TX0063011	28-Oct-00	14:12	284	Gallons
NORTHEAST QUAD	900 ELEANOR	MAIN LINE STOPPED UP	BUFFALO BAYOU	453-V	TX0063011	28-Oct-00	14:03	242	Gallons
NORTHEAST QUAD	215 LENNOX	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-Q	TX0096172	28-Oct-00	08:46	92	Gallons
SOUTHEAST QUAD	4320 WATSON	MAIN OVERFLOWING INTO STORM SEWER	BUFFALO BAYOU	453-X	TX0096172	29-Oct-00	10:15	270	Gallons
NORTHWEST QUAD	835 HEIGHTS	MAIN LINE AND SERVICE LINE HOLDING	BUFFALO BAYOU	492-D	TX0096172	29-Oct-00	14:10	1176	Gallons
SOUTHWEST QUAD	219 MARSHALL	SERVICE LINE STOPPED UP	BUFFALO BAYOU	493-T	TX0096172	29-Oct-00	14:30	1155	Gallons
SOUTHWEST QUAD	7992 LOCKE LN.	SEWER MAIN STOPPED UP	BUFFALO BAYOU	490-V	TX0096172	29-Oct-00	18:01	1930	Gallons
SOUTHWEST QUAD	4627 WARNING ST.	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-Z	TX0062995	30-Oct-00	14:33	5975	Gallons
NORTHWEST QUAD	1802 BRUN	CITY MAIN STOPPED UP	BUFFALO BAYOU	492-Q	TX0096172	30-Oct-00	10:15	34	Gallons
NORTHEAST QUAD	211 N. BRYAN	MAIN LINE AND SERVICE LINE HOLDING	BUFFALO BAYOU	494-P	TX0096172	30-Oct-00	10:10	90	Gallons
NORTHEAST QUAD	7331 FARNSWORTH	MAIN LINE STOPPED UP	BUFFALO BAYOU	453-L	TX0096172	30-Oct-00	11:28	7210	Gallons
NORTHWEST QUAD	6903 NORTH HAMPTON	MAIN STOPPED UP	BUFFALO BAYOU	491-C	TX0096172	30-Oct-00	09:05	3476	Gallons
SOUTHEAST QUAD	1406 JAMES	MAIN LINE STOPPED UP	BUFFALO BAYOU	493-H	TX0096172	31-Oct-00	13:24	513	Gallons
NORTHWEST QUAD	2520 PANAMA @ FULTON	MANHOLE OVERFLOWING INTO STORM SEWER	BUFFALO BAYOU	493-D	TX0096172	01-Nov-00	10:30	480	Gallons
NORTHEAST QUAD	6844 AVENUE O	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-V	TX0096172	01-Nov-00	09:00	147.5	Gallons
NORTHEAST QUAD	782 FAWN DR.	MAIN LINE STOPPED UP	BUFFALO BAYOU	496-D	TX0096172	01-Nov-00	16:50	910	Gallons
NORTHWEST QUAD	8800 LONG POINT	CITY MAIN STOPPED UP AND OVERFLOWING	BUFFALO BAYOU	450-V	TX0096172	02-Nov-00	12:47	430	Gallons
NORTHEAST QUAD	7141 AVENUE C ST.	OVERFLOW INTO DITCH	BUFFALO BAYOU	494-Z	TX0096172	02-Nov-00	09:10	209	Gallons
NORTHWEST QUAD	2011 DREXEL	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-N	TX0096172	02-Nov-00	21:12	903	Gallons
NORTHWEST QUAD	12633 MEMORIAL	MAIN LINE STOPPED UP	BUFFALO BAYOU	489-G	TX0063002	03-Nov-00	21:54	743	Gallons
SOUTHWEST QUAD	322 WESTHEIMER	STOPPAGE IN MAIN LINE	BUFFALO BAYOU	493-S	TX0096172	05-Nov-00	07:15	428	Gallons
NORTHWEST QUAD	1037 GESSNER	MAIN STOPPED UP	BUFFALO BAYOU	490-J	TX0096172	05-Nov-00	15:26	5510	Gallons
NORTHWEST QUAD	1037 GESSNER	MAIN STOPPED UP	BUFFALO BAYOU	490-J	TX0096172	05-Nov-00	15:26	5510	Gallons
SOUTHWEST QUAD	2510 WILLOWICK	MAIN LINE STOPPED UP	BUFFALO BAYOU	492-S	TX0096172	06-Nov-00	17:25	3980	Gallons
NORTHEAST QUAD	3713 JENSEN	MANHOLE OVERFLOWING CAUSING EXCURSION	BUFFALO BAYOU	454-W	TX0096172	07-Nov-00	15:05	513	Gallons
NORTHEAST QUAD	1121 TERMINAL	SERVICE LINE OVERFLOWING	BUFFALO BAYOU	494-V	TX0096172	07-Nov-00	21:42	683	Gallons
NORTHEAST QUAD	215 N. MILBY ST.	SERVICE LINE OVERFLOWING	BUFFALO BAYOU	494-P	TX0096172	07-Nov-00	21:20	1950	Gallons
NORTHEAST QUAD	WOODLEIGH @ SIDNEY	MAIN LINE STOPPED UP	BUFFALO BAYOU	494-S	TX0096172	08-Nov-00	13:20	117.5	Gallons
NORTHEAST QUAD	6815 ROSWELL	MAIN LINE STOPPAGE	BUFFALO BAYOU	453-Q	TX0096172	09-Nov-00	20:30	429	Gallons
NORTHWEST QUAD	19 CRESTWOOD	MAIN LINE OVERFLOWING INTO STREET	BUFFALO BAYOU	492-K	TX0096172	10-Nov-00	09:43	408	Gallons
NORTHEAST QUAD	1817 DUMBLE	MAIN LINE STOPPAGE	BUFFALO BAYOU	494-X	TX0096172	10-Nov-00	16:50	118	Gallons
NORTHWEST QUAD	BERING @ WOODWAY	MAIN LINE STOPPED UP	BUFFALO BAYOU	491-K	TX0063002	11-Nov-00	13:28	863	Gallons
NORTHEAST QUAD	10333 EAST FREEWAY	BROKEN CONNECTION OVER MAIN LINE	BUFFALO BAYOU	496-E	TX0096172	12-Nov-00	12:30	3768	Gallons
WASTEWATER OPERATIONS	1147 ENCLAVE PARKWAY	DRAIN WAS LEFT OPEN AND #3 LP TRIPPED.	BUFFALO BAYOU	488-G	TX0035017			2600	Gallons
SOUTHWEST QUAD	790 BATEWOOD	MAIN LINE STOPPED UP	BUFFALO BAYOU						
NORTHWEST QUADRANT	8903 LANGFIELD	MANHOLE STOPPED UP AND OVERFLOWING INTO STORMSEWER	WHITE OAK BAYOU	410-V	TX0063011	22-Jan-96	07:00	2105	Gallons
NORTHWEST QUADRANT	4400 HESLER @ EDSEE	SEWER MAIN STOPPAGE UP->OVERFLOW FROM MANHOLE	WHITE OAK BAYOU		TX0096172	29-Jan-96	07:00	13750	Gallons

Problem	Location	Description	Receiving stream	Key map	Permit	Date	Time	Volume	Unit
NORTHWEST QUADRANT	611 W. LITTLE YORK	STOPPAGE IN WASTEWATER MAIN, CAUSING WASTEWATER TO	WHITE OAK BAYOU	411-V	TX0096172	15-Feb-96	13:18	1825	Gallons
NORTHWEST QUADRANT	2000 THONING	8" MAIN STOPPED-UP.	WHITE OAK BAYOU	451-T	TX0057347	13-Mar-96	14:17	280	Gallons
NORTHWEST QUADRANT	10200 FIELD STONE	SEWER MAIN STOPPED UP CAUSING SEWER OVERFLOW VIA A	WHITE OAK	450-E	TX0096172	18-Mar-96	18:01	99.5	Gallons
NORTHWEST QUADRANT	400 MERRILL	BROKEN SEWER MAIN 8" DISCHARGING RAN SEWER INTO	WHITE OAK BAYOU	493-B	TX0096172	18-Mar-96	12:45	2175	Gallons
NORTHWEST QUADRANT	7300 KATY FRWY.	ROUTINE STOPPAGE	WHITE OAK BAYOU	492-B	TX0096172	22-Mar-96	13:24	3.5	Gallons
NORTHWEST QUADRANT	4843 GOLDEN FOREST	ILLEGAL HOOK-UP ON PRIVATE PROPERTY. CAUSING WW TO	WHITE OAK	451-G	TX0057347	23-Mar-96	10:15	1	GALLON
WASTEWATER OPERATION	2007 PARKER	FORCE LINE BROKEN	WHITE OAK BAYOU	492-H	TX0096172	02-Apr-96	17:30	331955	Gallons
NORTHWEST QUADRANT	100 WEST WHITNEY	SEWER MAIN STOPPED UP CAUSING SEWER OVERFLOW	WHITE OAK BAYOU	453-J	TX0057347	08-Apr-96	09:45	29	Gallons
NORTHWEST QUADRANT	5500 DESOTO	MAIN LINE OVERFLOWING INTO S SEWER	WHITE OAK BAYOU	451-C	TX0096172	11-Apr-96	18:28	310	Gallons
NORTHWEST QUADRANT	826 WOODLAND AT 800 EUCLID	6" SEWER LINE STOPPED UP CAUSING SEWER TO OVERFLOW	WHITE OAK BAYOU	493-B	TX0057347	16-Apr-96	10:37	153	Gallons
NORTHWEST QUADRANT	2200 STUDEWOOD AT ADELL	BROKEN SEWER MAIN CAUSED RAW SEWER TO GET IN MAIN	WHITE OAK BAYOU	453-S	TX0057347	18-Apr-96	11:00	12300	GALL
NORTHWEST QUADRANT	1806 STORY	ROUTINE STOPPAGE-GOING INTO WHITE OAK BAYOU	WHITE OAK BAYOU	451-Y	TX0057347	03-May-96	13:31	1008	Gallons
NORTHWEST QUADRANT	101 E. TIDWELL	STOPPAGE IN SEWER LINE WHICH CAUSED WASTEWATER TO	WHITE OAK BAYOU	453-E	TX0096172	05-May-96	13:03	3250	Gallons
NORTHWEST QUADRANT	1015 PEDDIE	STOPPED UP SEWER LINE RECEIVING INTO STORM SEWER	WHITE OAK BAYOU	453-X	TX0096172	06-May-96	13:07	413	Gallons
NORTHWEST QUADRANT	1600 STUDEWOOD	STOPPAGE IN SEWER LINE	WHITE OAK BAYOU	453-B	TX0096172	25-May-96	14:00	1580	Gallons
NORTHWEST QUADRANT	8100 MAIN ST.	MAIN SEWER LINE STOPGE; WW FLOW IN THE SYSTEM	WHITE OAK BAYOU	453-N	TX0096172	20-Jun-96	11:47	180	Gallons
NORTHWEST QUADRANT	900 WINSTON	MAIN STOPPAGE OVERFLOWING RAW SEWER INTO BAYOU	WHITE OAK BAYOU	453-X	TX0096172	26-Jun-96	12:52	50	Gallons
NORTHWEST QUADRANT	1000 W. 20TH STREET	SEWER MAIN HAS STOPPAGE.	WHITE OAK BAYOU	452-V	TX0096172	06-Jul-96	10:06	63	Gallons
NORTHWEST QUADRANT	800 W.16 @ 1500 DIANE	MAIN STOPPED UP CAUSING SEWER OVERFLOW	WHITE OAK BAYOU	452-Y	TX0096172	09-Jul-96	11:19	400	Gallons
NORTHWEST QUADRANT	800 W. 16 AT DIANE	SEWER MAIN STOPPED UP CAUSING OVERFLOW	WHITE OAK BAYOU	452-Y	TX0096172	18-Jul-96	10:33	500	Gallons
NORTHWEST QUADRANT	4401 AIRLINE	STOPPAGE IN SEWER LINE	WHITE OAK BAYOU	453-K	TX0057347	24-Jul-96	16:25	2640	Gallons
NORTHWEST QUADRANT	1500 W. 43	BROKEN 6"x7" SEWER MAIN CAUSED STOPPAGE & O/F.	WHITE OAK BAYOU	452-E	TX0096172	14-Aug-96	09:05	875	Gallons
NORTHWEST QUADRANT	3814 GARDENDALE	ROUTINE STOPPAGE	WHITE OAK BAYOU	452-N	TX0096172	09-Sep-96	11:30	6000	Gallons
NORTHWEST QUADRANT	7822 MAPLE TREE	SEWER STOPPED - UP	WHITE OAK BAYOU	411-Q	TX0057347	15-Sep-96	21:10	1228	Gallons
NORTHEAST QUADRANT	TRAVIS AND COMMERCE STREET	POSSIBLE CAVE-IN OR STOPPAGE	WHITE OAK BAYOU	493-L	TX0096172	19-Sep-96	10:20	288000	Gallons
NORTHEAST QUADRANT	MAIN AND WOOD STREET	POSSIBLE CAVE-IN OR STOPPAGE.	WHITE OAK BAYOU	493-M	TX0096172	19-Sep-96	10:30	288000	Gallons.
NORTHWEST QUADRANT	910 BYRON	STOPPED UP 6" SEWER MAIN CAUSING OVERFLOW.	WHITE OAK BAYOU	493-B	TX0096172	19-Oct-96	15:15	900	Gallons
NORTHWEST QUADRANT	3635 ABINGER	8X10 MN. STOPPED UP SEWER LINE.	WHITE OAK BAYOU	411-R	TX0057347	26-Dec-96	21:15	3300	Gallons
NORTHWEST QUADRANT	4000 W. 34TH	OVERFLOW FROM MANHOLE ENTERING STORM DRAIN.	WHITE OAK BAYOU	451-R	TX0057347	18-Jan-97	13:12	7004	Gallons
NORTHEAST QUADRANT	1200 WRIGHTWOOD	EXCESSIVE RAINFALL COLLECTION SYSTEM OVERFLOWING.	WHITE OAK BAYOU	493-C	TX0096172	27-Jan-97	20:00	640000	Gallons
NORTHWEST QUADRANT	1300 WRIGHTWOOD	TUNNEL SYSTEM HYDRAULIC OVERLOAD DUE TO HEAVY RAIN	WHITE OAK BAYOU	493-C	TX0096172	12-Feb-97	15:58	32600	Gallons
NORTHWEST QUADRANT	1500 WHITE OAK DRIVE	TUNNEL SYSTEM HYDRAULIC OVERLOAD DUE TO HEAVY RAIN	WHITE OAK BAYOU	493-C	TX0096172	12-Feb-97	15:58	32600	Gallons
NORTHWEST QUADRANT	319 EMBRY	24" BROKEN SEWER MAIN CAUSED SEWAGE TO OVERFLOW	WHITE OAK BAYOU	493-C	TX0096172	20-Feb-97	09:43	814	Gallons
NORTHWEST QUADRANT	9303 GUYWOOD	8x8 ROUTINE STOPPAGE	WHITE OAK BAYOU	410-V	TX0057347	22-Feb-97	14:50	1300	Gallons
NORTHWEST QUADRANT	10100 PINE MOSS	STOPPAGE IN AN 8"x12" CONCRETE SEWER MAIN.	WHITE OAK BAYOU	411-J	TX0057347	24-Feb-97	12:30	3645	Gallons
NORTHWEST QUADRANT	4808 YALE	6"x6" STOPPED-UP MAIN CAUSED OVERFLOW	WHITE OAK BAYOU	452-H	TX0057347	31-Mar-97	11:00	3090	Gallons
NORTHWEST QUADRANT	1400 WHITE OAK AT HOUSTON AVE.	HYDRAULIC OVERLOAD DUE TO HEAVY RAINFALL	WHITE OAK BAYOU	493-C	TX0096172	04-Apr-97	07:00	60000	Gallons
NORTHWEST QUADRANT	10010 PINE MOSS DRIVE	BROKEN 8" X 6" SEWER MAIN STOPPED-UP CAUSING O/F.	WHITE OAK BAYOU	411-N	TX0057347	15-Apr-97	11:37	2370	Gallons
WASTEWATER OPERATION	10273 GENARD	HYDRAULIC OVERLOAD DUE TO HEAVY RAINFALL. 2-HR PK.	WHITE OAK BAYOU	450-A	TX0026875	22-May-97	15:00	60000	Gallons
WASTEWATER OPERATION	10273 GERARD	2 HOUR PEAK FLOW	WHITE OAK BAYOU	450-A	TX0026875	24-May-97	15:00	0	
WASTEWATER OPERATION	10273 GERARD	2 HOUR PEAK FLOW	WHITE OAK BAYOU	450-A	TX0026875	25-May-97	11:00	0	
WASTEWATER OPERATION	10273 GENARD	RAS PUMP HAD STOPPAGE, SLUDGE SPILL OF MANHOLE	WHITE OAKS BAYOU	450-A	TX0026875	01-Jul-97	11:00	2000	Gallons
NORTHWEST QUADRANT	2322 PARANA	PUMP SEWER MAIN OVERFLOW INTO STORM SEWER MAIN.	WHITE OAK BAYOU	450-P	TX0063002	03-Jul-97	12:30	5500	Gallons
NORTHWEST QUADRANT	1002 CHAMBOARD @ ALBA	MANHOLE OVERFLOWED DUE TO STOPPAGE IN THE LINE.	WHITE OAK BAYOU	452-L	TX0096172	22-Aug-97	11:11	2004	Gallons
NORTHWEST QUADRANT	6006 NORTH FREEWAY	8' X 12" ROUTINE STOPPAGE.	WHITE OAK BAYOU	453-A	TX0026875	13-Sep-97	14:30	4965	Gallons
WASTEWATER OPERATION	10273 GENARD	2 - HOUR PEAK	WHITE OAK BAYOU	450-A	TX0026875	22-Sep-97	22:00	1.6	MGD
NORTHWEST QUADRANT	1500 WHITE OAK DRIVE	HEAVY RAINFALL SURCHARGED SYSTEM CAUSING OVERFLOW.	WHITE OAK BAYOU	493-B	TX0096172	23-Sep-97	13:45	36000	Gallons
NORTHEAST QUADRANT	1000 ALBER	SEWER MAIN STOPPED-UP CAUSING OVERFLOW INTO S/S.	WHITE OAK BAYOU	453-Z	TX0057347	25-Sep-97	10:43	453	Gallons
NORTHEAST QUADRANT	64 WELFORD	8" 9" SEWER MAIN BROKE , STOPPED-UP CAUSING O-L.	WHITE OAK	453-F	TX0096172	23-Nov-97	10:15	11655	GAL
NORTHEAST QUADRANT	3800 FULTON	SURCHARGED SYSTEM.	WHITE OAK BAYOU	453-Y	TX0096172	07-Jan-98	06:30	0	Undeter mined
NORTHEAST QUADRANT	3913 HAIN AT 3400 FULTON.	MAIN LINE STOPPED UP.	WHITE OAK BAYOU	453-Y	TX0026875	09-Jan-98	16:36	40	GPM
NORTHWEST QUADRANT	6523 FRENCH CHATEAU	ROUTINE STOPPAGE.	WHITE OAK BAYOU	411-T	TX0057347	30-Jan-98	10:59	855	Gallons
NORTHWEST QUADRANT	500 CROSSTIMBERS	GREASE IN LINE.	WHITE OAK BAYOU	452-M	TX0063011	30-Jan-98	13:15	146	Gallons
NORTHWEST QUADRANT	500 WSET CROSSTIMBERS	SEWER LINE COLLAPSED BLOCKED MAIN AND CAUSING O.F.	WHITE OAK BAYOU	452-M	TX0063011	03-Feb-98	14:30	415	Gallons
NORTHWEST QUADRANT	1700 SAWYER	STOPPAGE IN THE LINE CAUSING SEWER OVERFLOW.	WHITE OAK BAYOU	493-F	TX0096172	03-Feb-98	14:22	54	Gallons
NORTHEAST QUADRANT	601 AVENUE OF OAKS	BROKEN SEWER MAIN STOPPED-UP AND CAUSING OVERFLOW.	WHITE OAK BAYOU	453-U	TX0096172	03-Feb-98	12:51	3	Gallons

Problem	Location	Description	Receiving stream	Key map	Permit	Date	Time	Volume	Unit
NORTHWEST QUADRANT	600 WEST 6th	SEWER MAIN LINE STOPPAGE-UP CAUSING OVERFLOW.	WHITE OAK BAYOU	492-D	TX0096172	04-Feb-98	18:02	290	Gallons
NORTHWEST QUADRANT	1332 WEST 25	SEWER STOPPAGE	WHITE OAK BAYOU	452-U	TX0096172	04-Feb-98	10:48	35	Gallons
NORTHWEST QUADRANT	701 USENER	SEWER MAIN HAD STOPPAGE WHICH CAUSED AN EXCURSION.	WHITE OAK BAYOU	439-B	TX0063011	08-Feb-98	18:18	23.5	Gallons
NORTHWEST QUADRANT	515 HIGHLAND	STOPPED UP SEWER MAIN, FLOWING INTO STORM SEWER.	WHITE OAK BAYOU	493-B	TX0057347	11-Feb-98	09:25	54	Gallons
NORTHWEST QUADRANT	1828 LYNNVIEW	SEWER MAIN STOPPED UP AND OVERFLOWING INTO SEWER.	WHITE OAK BAYOU	451-S	TX0063011	12-Feb-98	08:18	205	Gallons
NORTHEAST QUADRANT	3200 NORTH MAIN	ROUTINE STOPPAGE.	WHITE OAK BAYOU	493-C	TX0096172	14-Feb-98	14:18	156	Gallons
NORTHWEST QUADRANT	1839 SALFORD	SEWER MAIN STOPPED-UP CAUSING OVER FLOW.	WHITE OAK BAYOU	452-S	TX0057347	18-Feb-98	10:39	690	Gallons
NORTHWEST QUADRANT	7028 ANTOINE	MAIN LINE STOPPED-UP CAUSING OVERFLOW.	WHITE OAK BAYOU	411-Y	TX0057347	18-Feb-98	10:01	24	Gallons
NORTHWEST QUADRANT	5411 LONG CREEK	STOPPAGE IN SEWER MAIN CAUSING AN OVERFLOW.	WHITE OAK BAYOU	411-U	TX0057347	19-Feb-98	11:35	60	GALS
NORTHWEST QUADRANT	522 HEIDRIDGE	MAIN LINE STOPPED UP.	WHITE OAK BAYOU	452-M	TX0057347	23-Feb-98	11:12	500	Gallons
NORTHWEST QUADRANT	249 NORVIEW	MAIN LINE STOPPED STOPPED UP.	WHITE OAK BAYOU	452-H	TX0057347	23-Feb-98	08:58	1270	Gallons
NORTHWEST QUADRANT	510 TABOR & 506 WALTRIP	8 X 15 SEWER MAIN STOPPED-UP.	WHITE OAK BAYOU	453-X	TX0096172	23-Feb-98	12:00	380	Gallons
NORTHWEST QUADRANT	4000 GOLF DRIVE	SEWER MAIN STOPPED UP & OVERFLOWING INTO S/SEWER.	WHITE OAK BAYOU	452-L	TX0057347	27-Feb-98	11:10	110	Gallons
NORTHWEST QUADRANT	1200 CHANTILLY	SEWER MAIN STOPPED-UP AND OVERFLOWING INTO STORM/D	WHITE OAK BAYOU.	452-K	TX0057347	18-Mar-98	08:48	282	Gallons
NORTHWEST QUADRANT	431 RED RIPPLE ROAD	SEWER MAIN STOPPED-UP.	WHITE OAK BAYOU	452-D	TX0057347	19-Mar-98	11:59	420	Gallons
NORTHWEST QUADRANT	3300 FULTON	SEWER MAIN STOPPED-UP DUE TO A DAMAGED MAIN.	WHITE OAK BAYOU.	453-Y	TX0026875	03-Apr-98	12:30	585	Gallons
NORTHWEST QUADRANT	768 WORTHSHIRE	SEWER MAIN STOPPED-UP CAUSING OVERFLOW.	WHITE OAK BAYOU	492-C	TX0026875	05-Apr-98	08:08	2700	Gallons
NORTHWEST QUADRANT	1920 W. 18th	SEWER MAIN STOPPED-UP CAUSING OVERFLOW.	WHITE OAK BAYOU	452-T	TX0026875	08-Apr-98	09:50	300	Gallons
NORTHWEST QUADRANT	2721 NORTH SHEPHERD	SEWER MAIN STOPPED UP.	WHITE OAK BAYOU	452-V	TX0057347	10-Apr-98	10:28	40	Gallons
NORTHWEST QUADRANT	1522 GLEN OAKS	PUMP STATION FAILED CAUSING MANHOLE TO OVERFLOW.	WHITE OAK BAYOU	492-C	TX0096172	23-Apr-98	14:02	2660	Gallons
NORTHWEST QUADRANT	3000 CRESDALE	SEWER MAIN STOPPED-UP AND OVERFLOWING .	WHITE OAK BAYOU	450-K	TX0057347	28-Apr-98	08:26	1600	Gallons
NORTHWEST QUADRANT	4400 NORTH SHEPHERD @ QUALEY	SEWER MAIN STOPPED-UP CAUSING OVERFLOW.	WHITE OAK BAYOU	452-M	TX0057347	07-May-98	14:04	660	Gallons
NORTHWEST QUADRANT	1002 WEST CAVACADE	STOPPAGE IN THE LINE CAUSING OVERFLOW INTO S/SEWER	WHITE OAK BAYOU	453-T	TX0057347	11-May-98	11:27	106	Gallons
NORTHWEST QUADRANT	5710 YALE	SEWER MAIN STOPPED-UP CAUSING OVERFLOW FROM M/HOLE	WHITE OAK BAYOU	452-D	TX0057347	18-May-98	12:10	435	Gallons
NORTHWEST QUADRANT	4512 PINEMONT STREET	PRIVATE SEPTIC TANK TAPPED INTO STORM SEWER MAIN.	WHITE OAK BAYOU	451-H	TX0063011	22-May-98	10:35	155	Gallons
NORTHWEST QUADRANT	8700 VARNER	SEWER MAIN SURCHARGED DUE TO STOPPAGE & OVERFLOWED	WHITE OAK BAYOU	450-V	TX0057347	02-Jun-98	12:58	330	Gallons
NORTHWEST QUADRANT	3135 CRESTDALE	SEWER MAIN SURCHARGED DUE TO STOPPAGE.	WHITE OAK BAYOU	450-K	TX0057347	17-Jun-98	13:28	60	Gallons
NORTHEAST QUADRANT	8700 MADIE DRIVE	SEWER MAIN STOPPED-UP AND CAUSING OVERFLOW.	WHITE OAK BAYOU	453-F	TX0096172	17-Jun-98	09:04	725	Gallons
NORTHEAST QUADRANT	8012 RAVENWOOD CIRCLE	SEWER MAIN STOPPED-UP CAUSING OVERFLOW.	WHITE OAK BAYOU	451-S	TX0057347	05-Aug-98	10:07	60	Gallons
NORTHWEST QUADRANT	1518 GLEN OAKS	SEWER MAIN STOPPED-UP CAUSING UNAVOIDABLE VOERFLOW	WHITE OAK BAYOU	492-C	TX0057347	23-Aug-98	15:11	2220	Gallons
NORTHWEST QUADRANT	800 NORTH DURHAM	LATERAL LINE STOPPED-UP CAUSING OVERFLOW FROM C/OT	WHITE OAK BAYOU	432-Y	TX0057347	26-Aug-98	12:15	225	Gallons
NORTHWEST QUADRANT	100 W. TIDWELL	ROUTINE STOPPAGE	WHITE OAK BAYOU	452-D	TX0096172	31-Aug-98	17:04	400	Gallons
NORTHWEST QUADRANT	9235 PECOS	SEWER LINE STOPPED-UP	WHITE OAK BAYOU	450-Y	TX0096172	30-Oct-98	13:10	480	Gallons
NORTHWEST QUADRANT	WATSON AND RIDGE	48" SEWER LINE SURCHARGED AND OVERFLOWING INTO 6 MANHOL	WHITE OAK BAYOU	493-B	TX0096172	13-Nov-98	00:01	Undeter	mined
NORTHWEST QUADRANT	309 THORNTON	SEWER MAIN STOPPED-UP AND VERFLOWED.	WHITE OAK BAYOU	452-M	TX0057347	19-Nov-98	08:10	3200	Gallons
NORTHWEST QUADRANT	3125 CRESTDALE STREET	STOPPAGE IN SEWER MAIN CAUSED OVERFLOW.	WHITE OAK BAYOU	450-K	TX0057347	03-Dec-98	11:57	7800	Gallons
NORTHEAST QUADRANT	4401 EDISON	UNAVOIDABLE RAW SEWER DISCHARGE DUE STOPPAGE IN THE LIN	WHITE OAK BAYOU	453-Y	TX0096172	29-Dec-98	10:38	174	Gallons
NORTHWEST QUADRANT	7032 ANTOINE	ROUTINE STOPPAGE.	WHITE OAK BAYOU	411-Y	TX0057347	21-Jan-99	11:22	1090	Gallons
NORTHWEST QUADRANT	1001 USENER AT MICHAUX	UNAVOIDABLE RAW SEWAGE DICHARGE DUE TO LINE STOPPAGE	WHITE OAK BAYOU	493-B	TX0096172	26-Jan-99	12:55	924	Gallons
NORTHWEST QUADRANT	5353 DEEP FOREST DRIVE	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO STOPPAGE.	WHITE OAK BAYOU	451-F	TX0057347	04-Feb-99	12:30	1515	Gallons
NORTHWEST QUADRANT	9702 JAY WOOD	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO STOPPAGE.	WHITE OAK BAYOU	410-P	TX0057347	04-Feb-99	13:20	410	Gallons
NORTHEAST QUADRANT	10410 BAUMAN	MAIN LINE STOPPAGE	WHITE OAK BAYOU	453-C	TX0026875	19-Feb-99	15:08	180	Gallons
NORTHWEST QUADRANT	5300 DEEP FOREST	SEWER MAIN STOPPAGE DUE TO GREASE IN THE LINE.	WHITE OAK BAYOU	451-F	TX0057347	22-Feb-99	16:01	213	Gallons
NORTHWEST QUADRANT	2003 HARLAND	STOPPAGE IN MAIN LINE	WHITE OAK BAYOU	451-T	TX0096172	22-Feb-99	10:35	1230	Gallons
NORTHEAST QUADRANT	7618 APPLETON	ROUTINE STOPPAGE	WHITE OAK BAYOU	453-L	TX0096172	22-Feb-99	13:35	60	Gallons
NORTHWEST QUADRANT	7030 ANTOINE	ROUTINE STOPPAGE	WHITE OAK BAYOU	411-Y	TX0057347	03-Mar-99	14:50	165	Gallons
NORTHWEST QUADRANT	9016 KEMPWOOD DRIVE	ROUTINE SEWER MAIN STOPPAGE	WHITE OAK BAYOU	450-Q	TX0063002	05-Mar-99	10:17	890	Gallons
NORTHWEST QUADRANT	9426 SPRING VIEW	UNAVOIDABLE SEWER DISCHARGE DUE TO STOPPAGE IN THE LINE	WHITE OAK BAYOU	450-K	TX0063011	10-Mar-99	13:35	2700	Gallons
NORTHWEST QUADRANT	700 WEST - 27 STREET	SEWER MAIN STOPPED-UP DUE TO GREASE IN THE LINE.	WHITE OAK BAYOU	452-V	TX0096172	10-Mar-99	12:05	410	Gallons
NORTHWEST QUADRANT	2118 WASHINGTON AVENUE	CONTRACTOR FAILED TO TAP-IN WHILE SLIP LINING.	WHITE OAK BAYOU	493-K	TX0096172	22-Mar-99	14:00	15875	Gallons
NORTHWEST QUADRANT	5555 HOLLY VIEW DR.	ROUTINE LINE STOPPAGE	WHITE OAK BAYOU	411-Y	TX0057347	29-Mar-99	12:01	4560	Gallons
NORTHWEST QUADRANT	434 FENN	ROUTINE LINE STOPPAGE	WHITE OAK BAYOU	452-M	TX0063011	29-Mar-99	10:16	900	Gallons
NORTHWEST QUADRANT	2835 CETTI	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO STOPPAGE.	WHITE OAK BAYOU	493-D	TX0057347	03-Apr-99	14:48	122	Gallons.
NORTHWEST QUADRANT	7703 STREAMSIDE	SEWER MAIN STOPPED-UP CAUSING OVERFLOW FROM A MANHOLE.	WHITE OAK BAYOU	411-U	TX0057347	09-Apr-99	13:55	2750	Gallons
NORTHWEST QUADRANT	202 VICTORIA	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO STOPPAGE.	WHITE OAK BAYOU	453-E	TX0096172	10-Apr-99	11:46	160	Gallons
NORTHWEST QUADRANT	835 HEIGHTS BOULEVARD	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO STOPPAGE.	WHITE OAK BAYOU	493-A	TX0096172	15-Apr-99	09:06	330	Gallons
NORTHWEST QUADRANT	10526 EAGLE GLEN DRIVE	SEWER MAIN STOPPAGE DUE TO GREASE IN THE LINE.	WHITE OAK BAYOU	449-H	TX0063011	22-Apr-99	09:08	328	Gallons

Problem	Location	Description	Receiving stream	Key map	Permit	Date	Time	Volume	Unit
NORTHWEST QUADRANT	901 HEIGHTS BLVD.	SEWER MAIN STOPPED-UP SURCHAREGED MAIN AND OVERFLOWED.	WHITE OAK BAYOU.	493-A	TX0057347	22-Apr-99	11:15	288	Gallons
NORTHWEST QUADRANT	915 MILWAUKEE	SEWER MAIN STOPPED-UP CAUSING OVERFLOW.	WHITE OAK BAYOU	453-U	TX0057347	13-May-99	07:58	610	Gallons
NORTHWEST QUADRANT	322 EAST JANISCH	ROUTINE STOPPAGE.	WHITE OAK BAYOU	453-D	TX0096172	14-May-99	11:22	1055	Gallons
NORTHWEST QUADRANT	1514 KNOX	ROUTINE STOPPAGE CAUSED RAW SEWAGE OVERFLOW	WHITE OAK BAYOU	492-G	TX0096172	19-May-99	09:27	1710	Gallons
NORTHWEST QUADRANT	2411 REINERMAN	UNAVOIDABLE RAW SEWAGE DISCHARGE	WHITE OAK BAYOU	492-C	TX0096172	01-Jun-99	09:35	250	Gallons
NORTHEAST QUADRANT	313 MOODY	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO STOPPAGE IN MAI	WHITE OAK BAYOU	453-U	TX0057347	04-Jun-99	09:55	76	Gallons
NORTHWEST QUADRANT	6900 LOG HOLLOW DRIVE	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO STOPPAGE.	WHITE OAK BAYOU	411-J	TX0057347	29-Jun-99	08:09	695	Gallons
NORTHWEST QUADRANT	1002 GARDENIA	UNAVOIDABLE RAW SEWAGE DISCHARGE DUE TO STOPPAGE.	WHITE OAK BAYOU	452-K	TX0057347	16-Jul-99	11:51	450	Gallons
NORTHEAST QUADRANT	3627 LEMON TREE LANE	ROUTINE STOPPAGE.	WHITE OAK BAYOU	411-V	TX0057347	29-Jul-99	17:05	2900	Gallons
NORTHWEST QUADRANT	430 TRUMAN	ROUTINE STOPPAGE.	WHITE OAK BAYOU	452-M	TX0057347	01-Aug-99	15:30	250	Gallons
NORTHWEST QUADRANT	10271 NORTH FREEWAY	SEWER MAIN STOPPED-UP.	WHITE OAK BAYOU	412-M	TX0057347	05-Aug-99	21:25	45300	Gallons
NORTHWEST QUADRANT	4513 OXFORD	ROUTINE STOPPAGE.	WHITE OAK BAYOU	453-J	TX0096172	05-Aug-99	11:51	335	Gallons
NORTHWEST QUADRANT	6335 FRENCH CHATEAU	ROUTINE STOPPAGE.	WHITE OAK BAYOU	411-T	TX0057347	06-Aug-99	09:49	1780	Gallons
NORTHWEST QUADRANT	1103 CLOVIS	ROUTINE MAIN STOPPAGE.	WHITE OAK BAYOU	452-X	TX0063011	13-Aug-99	14:25	1220	Gallons
NORTHWEST QUADRANT	101 EAST TIDWELL	ROUTINE STOPPAGE.	WHITE OAK BAYOU	453-B	TX0096172	27-Aug-99	09:45	240	Gallons
NORTHWEST QUADRANT	3000 HOUSTON AVENUE @ NORTH ST	ROUTINE STOPPAGE.	WHITE OAK BAYOU	493-C	TX0096172	27-Aug-99	10:48	8856	Gallons
NORTHEAST QUADRANT	2326 OTTO	SEWER MAIN STOPPED-UP.	WHITE OAK BAYOU	454-A	TX0096172	31-Aug-99	08:00	435	Gallons
NORTHEAST QUADRANT	808 ELEANOR	MAIN LINE STOPPED-UP.	WHITE OAK BAYOU	453-R	TX0063029	05-Sep-99	08:42		UNDE RMINED
SOUTHEAST QUADRANT	5820 GANO	SEWER MAIN STOPPAGE.	WHITE OAK BAYOU	452-V	TX0096172	13-Sep-99	16:19	74	Gallons
SOUTHEAST QUADRANT	4516 IRVINGTON	SEWER MAIN STOPPED-UP.	WHITE OAK BAYOU	453-Y	TX0096172	13-Sep-99	15:50	355	Gallons
NORTHWEST QUADRANT	6147 QUEENWOOD LANE	SEWER MAIN STOPPED-UP.	WHITE OAK BAYOU	492-B	TX0096172	21-Sep-99	16:10	225	Gallons
NORTHWEST QUADRANT	2611 BAYLOR	ROUTIN STOPPAGE IN LINE.	WHITE OAK BAYOU	453-T	TX0057347	26-Sep-99	08:23	560	Gallons
NORTHWEST QUADRANT	509 BARKLEY @ HAYGOOD	SEWER MAIN STOPPED	WHITE OAK BAYOU	453-J	TX0096172	27-Sep-99	10:54	712	Gallons
NORTHEAST QUADRANT	4000 AIRLINE @ CROSSTIMBERS	SEWER MAIN STOPPED-UP.	WHITE OAK BAYOU	453-K	TX0096172	27-Sep-99	11:56	1417	Gallons
NORTHWEST QUADRANT	818 PINEMONT	ROUTINE STOPPAGE.	WHITE OAK BAYOU	452-G	TX0096172	28-Sep-99	09:56	15	GPM
NORTHWEST QUADRANT	5350 GULF BANK @ STREAMSIDE	LIFT STATION DOWN.	WHITE OAK BAYOU	411-Q	TX0063011	02-Oct-99	10:57	12900	Gallons
NORTHWEST QUADRANT	9831 KNOBOK DRIVE	ROUTINE STOPPAGE.	WHITE OAK BAYOU	450-S	TX0096172	04-Oct-99	09:10	690	Gallons
NORTHWEST QUADRANT	5100 SAN FELIPE	ROUTINE STOPPAGE.	WHITE OAK BAYOU	491-Q	TX0096172	04-Oct-99	15:45	905	Gallons
NORTHWEST QUADRANT	4400 DONNA BELL	ROUTINE LINE STOPPAGE.	WHITE OAK BAYOU	452-E	TX0063011	11-Oct-99	15:18	405	Gallons
NORTHWEST QUADRANT	6438 CINDY	BROKEN SEWER MAIN STOPPED-UP.	WHITE OAK BAYOU	452-X	TX0096172	11-Oct-99	16:15	950	Gallons
NORTHEAST QUADRANT	1107 CLOVIS	SEWER MAIN STOPPED-UP.	WHITE OAK BAYOU	452-X	TX0096172	12-Oct-99	12:47	1330	Gallons
NORTHWEST QUADRANT	1742 WOODVINE	ROUTINE STOPPAGE.	WHITE OAK BAYOU	451-T	TX0063011	13-Oct-99	11:50	660	Gallons
NORTHWEST QUADRANT	6506 RUSSETT	STOPPAGE IN MAIN LINE	WHITE OAK BAYOU	411-R	TX0057347	20-Oct-99	08:47	370	Gallons
Northwest Quadrant	5300 DeSoto	Main Line Stopped Up.	White Oak Bayou	451-C	TX0057347	26-Oct-99	10:06	1410	Gallons
NORTHWEST QUADRANT	1200 SHIRKMERE RD.	ROUTINE STOPPAGE	WHITE OAK BAYOU	452-X	TX0057347	29-Oct-99	10:02	520	Gallons
NORTHWEST QUADRANT	432 TRUMAN	ROUTINE STOPPAGE	WHITE OAK BAYOU	452-M	TX0026875	03-Nov-99	11:40	880	Gallons
NORTHWEST QUADRANT	116 W.CROSSTIMBERS	ROUTINE STOPPAGE	WHITE OAK BAYOU	452-M	TX0096172	03-Nov-99	11:50	1860	Gallons
NORTHWEST QUADRANT	1500 W.43RD STREET	MAIN LINE STOPED UP	WHITE OAK BAYOU	453-J	TX0026875	04-Nov-99	13:50	205	Gallons
NORTHWEST QUADRANT	3615 CHERRY FOREST	ROUTINE STOPPAGE	WHITE OAK BAYOU	411-V	TX0096172	05-Nov-99	16:30	350	Gallons
NORTHWEST QUADRANT	116 W.CROSSTIMBERS	MAIN LINE STOPED UP DUE TO REPAIR	WHITE OAK BAYOU	452-M	TX0057347	06-Nov-99	11:13	340	Gallons
NORTHWEST QUADRANT	5555 W.GULFBANK	ROUTINE STOPPAGE	WHITE OAK BAYOU	411-P	TX0057347	06-Nov-99	10:37	765	Gallons
NORTHWEST QUADRANT	7062 W.GULFBANK	ROUTINE STOPPAGE	WHITE OAK BAYOU	411-N	TX0057347	06-Nov-99	13:33	195	Gallons
NORTHWEST QUADRANT	9800 NORTHWEST FREEWAY	ROUTINE STOPPAGE	WHITE OAK BAYOU	451-V	TX0096172	06-Nov-99	15:50	2400	Gallons
NORTHEAST QUADRANT	1703 STONECREST	MAIN LINE HAD STOPPAGE	WHITE OAK BAYOU	452-P	TX0096172	09-Nov-99	08:20	855	Gallons
NORTHWEST QUADRANT	432 & 412 TRUMAN STREET	ROUTINE STOPPAGE	WHITE OAK BAYOU	452-M	TX0096172	10-Nov-99	15:33	114	Gallons
NORTHWEST QUADRANT	7030 ANTOINE	ROUTINE STOPPAGE	WHITE OAK BAYOU	411-U	TX0057347	11-Nov-99	14:14	555	Gallons
NORTHWEST QUADRANTS	4000 W. 43rd	ROUTINE STOPPAGE IN MAIN LINE	WHITE OAK BAYOU	451-R	TX0096172	12-Nov-99	13:46	540	Gallons
NORTHEAST QUADRANT	2222 WHITE OAK	ROUTINE STOPPAGE	WHITE OAK BAYOU	493-O	TX0035009	16-Nov-99	21:38	18150	Gallons
NORTHWEST QUADRANT	6002 CHRYSSTELL	ROUTINE STOPPAGE	WHITE OAK BAYOU	451-F	TX0096172	17-Nov-99	10:53	1510	Gallons
NORTHEAST QUADRANT	121 E. TIDWELL RD.	ROUTINE STOPPAGE	WHITE OAK BAYOU	452-D	TX0035009	18-Nov-99	14:17	125	Gallons
NORTHWEST QUADRANT	6042 CRAB ORCHARD	ROUTINE STOPPAGE	WHITE OAK BAYOU	491-J	TX0096172	18-Nov-99	13:07	3080	Gallons
NORTHEAST QUADRANT	1002 CAVALCADE	ROUTINE STOPPAGE	WHITE OAK BAYOU	453-T	TX0096172	18-Nov-99	20:14	3315	Gallons
NORTHWEST QUADRANT	7058 W.GULF BANK	MAIN STOPPED UP	WHITE OAK BAYOU	410-R	TX0057347	24-Nov-99	10:27	380	Gallons
NORTHEAST QUADRANT	OLD YALE/ 222 E. CROSSTIMBERS	SEWAGE BACK UP	WHITE OAK BAYOU	453-S	TX0057347	24-Nov-99	13:08	4920	Gallons
NORTHWEST QUADRANT	4526 FALLEN OAKS DR.	CITY MAIN STOPPED UP	WHITE OAK BAYOU	451-D	TX0063011	24-Nov-99	10:08	190	Gallons
NORTHWEST QUADRANT	1518 GLEN OAK	ROUTINE STOPPAGE	WHITE OAK BAYOU	492-C	TX0096172	27-Nov-99	09:27	500	Gallons
NORTHWEST QUADRANT	7426 SAWMILL TRAIL	ROUTINE STOPPAGE	WHITE OAK BAYOU	410-M	TX0057347	29-Nov-99	12:26	320	Gallons
NORTHEAST QUADRANT	101 E. TIDWELL	ROUTINE STOPPAGE	WHITE OAK BAYOU	453-A	TX0096172	29-Nov-99	16:05	170	Gallons
NORTHEAST QUADRANT	2222 WHITE OAK	ROUTINE STOPPAGE	WHITE OAK BAYOU	453-A	TX0096172	29-Nov-99	17:56	950	Gallons
NORTHWEST QUADRANT	1119 WISTERWOOD	ROUTINE STOPPAGE	WHITEOAK BAYOU	449-Z	TX0057347	29-Nov-99	10:14	880	Gallons
NORTHWEST QUADRANT	8200 CHATEAU FOREST	MAIN LINE STOPPAGE	WHITE OAK BAYOU	411-S	TX0096172	01-Dec-99	10:52	440	Gallons
NORTHEAST QUADRANT	621 WENDELL	ROUTINE LINE STOPPAGE	WHITE OAK BAYOU	493-B	TX0096172	02-Dec-99	10:13	7370	Gallons
WESTWAY MUD	526 EAGLE GLEN	ROUTINE STOPPAGE	WHITE OAKS BAYOU	449-H	TX0026875	02-Dec-99	13:54	318	Gallons
NORTHWEST	1926 WOODVINE926	ROUTINE STOPPAGE	WHITE OAKS BAYOU	451-T	TX0063011	02-Dec-99	10:41	340	Gallons
NORTHEAST QUADRANT	902 E. 33 RD	ROUTINE STOPPAGE	WHITE OAK BAYOU	453-N	TX0096172	05-Dec-99	10:35	201	Gallons
NORTHWEST QUADRANT.	621 WENDEL	ROUTINE STOPPAGE	WHITE OAK BAYOU	493-B	TX0096172	07-Dec-99	18:35	145	Gallons
NORTHWEST QUADRANT	116 W. CROSSTIMBERS	ROUTINE STOPPAGE	WHITE OAK BAYOU	452-M	TX0057347	08-Dec-99	10:59	1116	Gallons
NORTHWEST QUADRANT	7202 ANTOINE	ROUTINE STOPPAGE	WHITE OAK BAYOU	411-Y	TX0057347	09-Dec-99	13:50	660	Gallons
NORTHEAST QUADRANT	116 E. CROSSTIMBERS	ROUTINE STOPPAGE	WHITE OAK BAYOU	453-J	TX0096172	10-Dec-99	08:58	990	Gallons
SOUTHWEST QUADRANT	918 PEDEN	MAIN-LINE STOPPAGE	WHITE OAK BAYOU	493-D	TX0096172	10-Dec-99	16:50	1050	Gallons
NORTHWEST QUADRANT	7202 ATHLONE	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-Y	TX0057347	13-Dec-99	12:54	500	Gallons
NORTHWEST QUADRANT	WEST 34TH AT 290	MAIN LINE STOPPED UP	WHITE OAK BAYOU	451-R	TX0096172	13-Dec-99	08:46	510	Gallons
NORTHWEST QUADRANT	7202 RIDGE OAK	ROUTINE STOPPAGE	WHITE OAK BAYOU	411-T	TX0057347	15-Dec-99	12:55	1020	Gallons
NORTHWEST QUADRANT	5800 SHAVELSON	ROUTINE STOPPAGE	WHITE OAK BAYOU	491-E	TX0063011	17-Dec-99	19:24	2525	Gallons
NORTHWEST QUADRANT	7202 ATHLONE	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-Y	TX0057347	18-Dec-99	11:42	68	Gallons
NORTHWEST QUADRANT	6505 ANTOINE	ROUTINE STOPPAGE	WHITE OAK BAYOU	411-Y	TX0063011	18-Dec-99	13:08	1392	Gallons
NORTHWEST QUADRANT	5853 W. GULF BANK	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-Q	TX0096172	18-Dec-99	10:27	201	Gallons

Problem	Location	Description	Receiving stream	Key map	Permit	Date	Time	Volume	Unit
NORTHWEST QUADRANT.	8701 HAMMERLY	ROUTINE STOPPAGE	WHITE OAK BAYOU	450-Q	TX0026875	19-Dec-99	13:15	1280	Gallons
NORTHWEST QUADRANT.	7028 ANTOINE	ROUTINE STOPPAGE	WHITE OAK BAYOU	411-U	TX0057347	22-Dec-99	11:44	610	Gallons
NORTHWEST QUADRANT.	310 FENN	ROUTINE STOPPAGE	WHITE OAK BAYOU	411-N	TX0057347	22-Dec-99	20:43	3000	Gallons
NORTHWEST QUADRANT.	206 FAUST	ROUTINE STOPPAGE	WHITE OAK BAYOU	489-M	TX0063011	22-Dec-99	11:37	2980	Gallons
NORTHWEST QUADRANT	8807 EMNORA	MAIN LINE STOPPED UP	WHITE OAK BAYOU	450-R	TX0057347	24-Dec-99	10:00	204	Gallons
NORTHWEST QUADRANT	5700 W. GULF BANK	SEWER LINE STOPPED UP	WHITE OAK BAYOU	411-P	TX0063011	25-Dec-99	17:27	130	Gallons
NORTHEAST QUADRANT	1613 CHESTNUT	ROUTINE STOPPAGE	WHITE OAK BAYOU	493-H	TX0096172	25-Dec-99	11:48	19	Gallons
N.W. QUADRANT	5300 W. GULFBANK	SEWER MAIN STOPPED UP	WHITE OAK BAYOU	412-M	TX0057347	25-Dec-99	16:45	180	Gallons
NORTHWEST QUAD	1235WEST 25TH	SEWER MAIN STOPPED UP	WHITE OAK BAYOU	452-U	TX0057347	26-Dec-99	14:21	310	Gallons
NORTHWEST QUADRANT.	5222 LIDO	ROUTINE STOPPAGE	WHITE OAK BAYOU	451-G	TX0063011	28-Dec-99	11:59	665	Gallons
NORTHWEST QUADRANT	4920 MARABLE	ROUTINE LINE STOPPAGE	WHITE OAK BAYOU	453-E	TX0063011	29-Dec-99	08:39	700	Gallons
NORTHWEST QUADRANT	5673 YALE	ROUTINE LINE STOPPAGE	WHITE OAK BAYOU	452-D	TX0063011	29-Dec-99	11:43	545	Gallons
NORTHWEST QUADRANT	5819 VILLAGE FOREST CT	STOPPAGE IN MAIN	WHITE OAKS BAYOU	451-C	TX0063011	30-Dec-99	13:26	635	Gallons
NORTHWEST QUADRANT.	4010 CYPRESSGROVE LN.	MAIN LINE STOPPED UP, OVERFLOWING INT STORM SEWER.	WHITE OAK BAYOU	411-U	TX0057347	02-Jan-00	20:50	3825	Gallons
NORTHWEST QUADRANT.	7200 ANTHLONE	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-Y	TX0057347	02-Jan-00	20:02	5026	Gallons
NORTHWEST	4300 ROSSLYN RD.	ROUTINE STOPPAGE	WHITE OAK BAYOU	452-J	TX0096172	02-Jan-00	14:01	1545	Gallons
NORTHWEST QUADRANT.	1332 W. 25TH. STREET	ROUTINE STOPPAGE	WHITE OAK BAYOU	452-T	TX0096172	02-Jan-00	18:50	9600	Gallons
NORTHWEST QUADRANT	1100 STUDEWOOD	MAIN LINE STOPPED UP	WHITE OAK BAYOU	453-W	TX0026875	03-Jan-00	13:49	955	Gallons
NORTHWEST QUADRANT	500 THORNTON	ROUTINE LINE STOPPAGE	WHITE OAK BAYOU	452-M	TX0096172	03-Jan-00	11:40	1730	Gallons
N.W.T.P. QUAD	5349 LYNBROOK	ROUTINE STOPPAGE	WHITE OAK BAYOU	491-L	TX0026875	04-Jan-00	11:32	104	Gallons
N.W. QUADRANT	8019 W.RAY CT.	ROUTINE STOPPAGE	WHITE OAK BAYOU	411-P	TX0057347	05-Jan-00	10:09	415	Gallons
SOUTHWEST QUADRANT	4909 SAXON	MAIN LINE STOPPED UP	WHITE OAK BAYOU	451-L	TX0057347	06-Jan-00	09:26	1305	Gallons
NORTHWEST QUADRANT	7207 ATHLONE	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-Y	TX0057347	07-Jan-00	08:39	320	Gallons
NORTHWEST QUADRANT	4630 DACOMA	MAIN LINE STOPPED UP	WHITE OAK BAYOU	451-Y	TX0096172	09-Jan-00	09:15	444	Gallons
SOUTHWEST QUADRANT	5427 GESSNER	ROUTINE STOPPAGE	WHITE OAK BAYOU	450-A	TX0062995	11-Jan-00	08:15	222	Gallons
NORTHWEST QUADRANT	1855 WIRT	ROUTINE STOPPAGE	WHITE OAK BAYOU	451-T	TX0096172	11-Jan-00	11:35	2345	Gallons
NORTHWEST QUADRANT	430 DEL NORTE	ROUTINE STOPPAGE	WHITE OAK BAYOU	452-H	TX0057347	12-Jan-00	10:46	875	Gallons
NORTHEAST QUADRANT	735 W. CALVALCADE	ROUTINE STOPPAGE	WHITE OAK BAYOU	453-T	TX0096172	12-Jan-00	13:48	1860	Gallons
NORTH CENTRAL	826 W. 30TH	PRIVATE STOPPAGE	WHITE OAKS BAYOU	452-Q	TX0096172	13-Jan-00	11:04	6120	Gallons
NORTHWEST QUADRANT.	7200 ATHLONE	MAIN LINE STOPPED UP.	WHITE OAK BAYOU	411-U	TX0057347	14-Jan-00	10:45	1200	Gallons
NORTHWEST QUADRANT	6335 FRENCH CHATON	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-T	TX0057347	16-Jan-00	13:15	1515	Gallons
NORTHWEST QUADRANT	8311 MELROSE	ROUTINE STOPPAGE	WHITE OAK BAYOU	453-C	TX0057347	17-Jan-00	17:18	145	Gallons
NORTHEAST QUADRANT	417 THORNTON	MAIN LINE STOPPED UP	WHITE OAK BAYOU	452-M	TX0096172	17-Jan-00	10:21	510	Gallons
NORTHWEST QUADRANT	1400 SPRING ROCK	ROUTINE STOPPAGE	WHITE OAK BAYOU	450-X	TX0057347	18-Jan-00	13:06	290	Gallons
NORTHWEST QUADRANT	3405 SHEPARED	SEWER LINE APARTMENTFLOWING INTO WHITE OAK BAYOU	WHITE OAK BAYOU	452-A	TX0057347	18-Jan-00	18:58	1706	Gallons
NORTHEAST QUADRANT	4808 MICHAUX	ROUTINE STOPPAGE	WHITE OAK BAYOU	453-X	TX0096172	19-Jan-00	09:56	855	Gallons
NORTHWEST QUADRANT	800 WILKES	MAIN LINE STOPPED UP	WHITE OAK BAYOU	493-C	TX0057347	19-Jan-00	10:40	450	Gallons
NORTHWEST QUADRANT	418 BISHOP	STOPPAGE IN MAIN LINE	WHITE OAK BAYOU	493-G	TX0057347	19-Jan-00	09:10	641	Gallons
NORTHWEST QUADRANT	10984 NORTH FREEWAY	MAIN LINE STOPPED UP	WHITE OAK BAYOU	412-M	TX0057347	19-Jan-00	13:50	1888	Gallons
NORTHWEST QUADRANT	2627 GARWOOD	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-Z	TX0057347	19-Jan-00	08:05	8450	Gallons
NORTHEAST QUADRANT	2816 CALLIE	ROUTINE STOPPAGE	WHITE OAK BAYOU	494-W	TX0096172	19-Jan-00	18:16	230	Gallons
NORTHWEST QUADS	735 CAVALCADE	ROUTINE STOPPAGE	WHITE OAK BAYOU	453-T	TX0096172	22-Jan-00	08:01	644	Gallons
NORTHWEST QUADRANT	207 LINDALE	ROUTINE STOPPAGE	WHITE OAK BAYOU	453-Q	TX0026875	23-Jan-00	16:43	120	Gallons
NORTHWEST QUADRANT	5550 HOLLY VIEW	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-Y	TX0057347	26-Jan-00	13:15	225	Gallons
NORTHEAST QUADRANT	735CALVACADE	ROUTINE STOPPAGE	WHITE OAK BAYOU	453-V	TX0096172	26-Jan-00	7:51	3090	Gallons
NORTHWEST QUADRANT	10333 NORTHWEST FREEWAY	ROUTINE STOPPAGE	WHITE OAK BAYOU	451-C	TX0096172	27-Jan-00	12:26	1070	Gallons
NORTHWEST QUAD	809 MILWAUKEE	ROUTINE STOPPAGE	WHITE OAK BAYOU	453-W	TX0057347	30-Jan-00	08:25	175	Gallons
NORTHWEST QUAD	3300 JULIAN	MAIN LINE STOPPED UP	WHITE OAK BAYOU	493-B	TX0096172	31-Jan-00	10:15	2232	Gallons
NORTH WEST QUADRANT	5403 LONG CREEK	BROKEN SEWER PIPE	WHITE OAK BAYOU	411-U	TX0063011	01-Feb-00	10:21	5780	Gallons
NORTHEAST QUADRANT	1107 HERKIMER ST.	MAIN LINE STOPPED UP, FLOWING INTO STREET, & SEWER	WHITE OAKS BAYOU	452-Z	TX0096172	02-Feb-00	14:41	150	Gallons
NORTHWEST QUADRANT	206 W. 44TH ST.	SEWER STOPPAGE	WHITE OAK BAYOU	452-M	TX0096172	03-Feb-00	09:35	575	Gallons
NORTHWEST QUADRANT	W.34TH STREET @ 290	GREASE IN LINE CAUSING SEWAGETO GO IN BAYOU	WHITE OAK BAYOU	451-R	TX0096172	03-Feb-00	11:07	504	Gallons
NORTHWEST QUADRANT	4200 W. 34th ST.	APARTMENT STOPPAGE CAUSED SEWER EXCURSION	WHITE OAK BAYOU	451-R	TX0096172	03-Feb-00	10:25	1140	Gallons
NORTH WEST QUADRANT	LONG LEAF @ BAYOU FOREST	DAMAGED FORCE (REPAIR PENDING) CALLED PROCESS OPER. ON G	WHITE OAK BAYOU	411-P	TX0057347	04-Feb-00	8:05	420	Gallons
NORTH WEST QUADRANT	LONG LEAF @ BAYOU FOREST	DAMAGED FORCE (REPAIR PENDING) NOTIFIED (GEORGE) OF PROCES	WHITE OAK BAYOU	411-P	TX0057347	04-Feb-00	12:27	420	Gallons
NORTH WEST QUADRANT	7028 ANTOINE	MAIN LINE STOPPED UP, ROUTINE STOPPAGE	WHITE OAK BAYOU	411-Y	TX0063002	09-Feb-00	10:19	540	Gallons
NORTH WEST QUADRANT	5714 GULF BANK	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-P	TX0057347	10-Feb-00	13:00	665	Gallons
NORTH WEST QUADRANT	915 OMAR	MAIN LINE STOPPED UP. OVER LAP	WHITE OAK BAYOU	493-B	TX0096172	10-Feb-00	8:14	717	Gallons
NORTHWEST QUADRANT	8900 LONGPOINT RD.	ROUTINE STOPPAGE	WHITE OAK BAYOU	450-V	TX0026875	11-Feb-00	11:40	162	Gallons
NORTH WEST QUADRANT	604 W.11th	STOPPAGE IN MAIN LINE	WHITE OAK	453-W	TX0096172	15-Feb-00	19:37	158	Gallons
NORTH WEST QUADRANT	2076 ANTOINE DR.	ROUTINE STOPPAGE	WHITE OAK BAYOU	451-T	TX0057347	15-Feb-00	11:06	84	Gallons
NORTH WEST QUADRANT	2010 JOHANNA DR.	ROUTINE STOPPAGE	WHITE OAK BAYOU	451-T	TX0057347	15-Feb-00	11:01	480	Gallons
NORTH WEST QUADRANT	6906 LOGHOLLOW	ROUTINE STOPPAGE	WHITE OAK BAYOU	411-S	TX0057347	18-Feb-00	10:22	573	Gallons
NORTH WEST QUADRANT	7611 WESTVIEW	REPAIR PENDING/CAUSING OVER FLOW	WHITE OAK BAYOU	451-X	TX0057347	18-Feb-00	13:20	160	Gallons
NORTH WEST QUADRANT	7602 MOSEWOOD	MAIN LINE STOPPED UP	WHITE OAK BAYOU	410-V	TX0057347	18-Feb-00	9:47	4340	Gallons
NORTHEAST QUADRANT	250 VICTORIA	MAIN LINE STOPPED UP	WHITE OAK BAYOU	452-H	TX0063011	20-Feb-00	10:00	590	Gallons
NORTH WEST QUADRANT	7206 BAYOUWOOD	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-T	TX0057347	21-Feb-00	10:05	363	Gallons
NORTHWEST QUADRANT	7502 BREEZEWAY	ROUTINE STOPPAGE	WHITE OAK BAYOU	410-Y	TX0057347	22-Feb-00	09:58	5720	Gallons
NORTH WEST QUADRANT	9200 N. HOUSTON ROSSLYN	ROUTINE STOPPAGE: SEWER MAIN STOPPED UP	WHITE OAK BAYOU	411-J	TX0063011	22-Feb-00	9:03	1300	Gallons
NORTHWEST QUADRANT	4058 BOLIN	ROUTINE STOPPAGE	WHITE OAK BAYOU	451-K	TX0057347	23-Feb-00	13:11	375	Gallons
NORTH WEST QUADRANT	1600 N.DURHAM	STOPPAGE	WHITE OAK BAYOU	452-Y	TX0096172	23-Feb-00	17:06	3720	Gallons
NORTH EAST QUADRANT	4503 WERNER	MAIN LINE STOPPED UP	WHITE OAK BAYOU	453-J	TX0096172	24-Feb-00	14:37	366	Gallons
NORTHWEST QUADRANT	3627 LEMON TREE	STOPPAGE IN MAIN LINE	WHITE OAK BAYOU	411-N	TX0057347	27-Feb-00	18:35	740	Gallons
NORTHEAST QUADRANT	4001 AVERILL	MAIN LINE STOPPED UP	WHITE OAK BAYOU	453-Y	TX0057347	28-Feb-00	14:22	46	Gallons
NORTHWEST QUADS	509 E. WELLINGTON	MAIN LINE STOPPED UP	WHITE OAK BAYOU	413-Y	TX0057347	29-Feb-00	11:00	900	Gallons
NORTH WEST QUADRANT	724W . 21st street	MAIN LINE STOPPED UP	WHITE OAK BAYOU	452-U	TX0057347	01-Mar-00	10:05	170	Gallons
NORTH WEST QUADRANT	4803 YALE	ROUTINE STOPPAGE	WHITE OAK BAYOU	452-H	TX0096172	02-Mar-00	13:25	1300	Gallons
NORTHWEST QUADRANT	2807 BEAUCHAMP	MAIN LINE STOPPED UP	WHITE OAK BAYOU	493-B	TX0057347	03-Mar-00	09:24	219	Gallons
SOUTHEAST QUADRANT	1410 GOLIAD	COMMUNITY LINE STOPPED UP	WHITE OAK BAYOU	493-G	TX0057347	03-Mar-00	09:19	233	Gallons
NORTHWEST QUADRANT	7018 VENUS ST.	ROUTINE STOPPAGE	WHITE OAK BAYOU	411-Z	TX0057347	03-Mar-00	11:42	975	Gallons
NORTHWEST QUADRANT.	2503 WHITE OAK DR.	ROUTINE STOPPAGE	WHITE OAK BAYOU	493-B	TX0096172	06-Mar-00	09:59	172	Gallons

Problem	Location	Description	Receiving stream	Key map	Permit	Date	Time	Volume	Unit
NORTH WEST QUADRANT	506 SURRATT	MAIN LINE STOPPED UP/ ROUTINE	WHITE OAK BAYOU	452-D	TX0057347	06-Mar-00	8:45	60	Gallons
NORTHEAST QUADRANT.	55 SUNNYSIDE	MAIN LINE STOPPED UP.	WHITE OAK BAYOU	413-X	TX0057347	06-Mar-00	09:26	147	Gallons
NORTHEAST QUADRANT	4001 AVERILL	ROUTINE STOPPAGE	WHITE OAK BAYOU	453-Y	TX0096172	07-Mar-00	20:00	120	Gallons
NORTHWEST QUAD	8718 ROAING POINT	MAIN LINE STOPPED UP/ ROUTINE	WHITE OAK BAYOU	411-R	TX0057347	15-Mar-00	9:41	828	Gallons
SOUTHEAST QUADRANT.	4120 KOLB	ROUTINE STOPPAGE	WHITE OAK BAYOU	494-H	TX0096172	17-Mar-00	16:27	255	Gallons
NORTHWEST QUADRANT	2201 GARDENIA LN.	MANHOLE OVERFLOWING CAUSEING EXCURSION	WHITEOAK BAYOU	451-M	TX0057347	18-Mar-00	11:59	332	Gallons
NORTHWEST QUADRANT	8810LONGPOINT	ROUTINE STOPPAGE CAUSING OVERFLOW	WHITE OAKS BAYOU	450-V	TX0026875	19-Mar-00	10:15	3070	Gallons
NORTHWEST QUADRANT	7426 SAW MILLS TRAIL	MANHOLE OVERFLOW CAUSING EXCURSION	WHITE OAKS BAYOU	410-M	TX0057347	19-Mar-00	12:48	1110	Gallons
NORTHWEST QUAD	4503 WERNER	MAIN LINE STOP UP SEWER IN DITCH	WHITE OAD BAYOU	453-J	TX0057347	20-Mar-00	13:13	90	Gallons
NORTHWEST QUAD	8601 NORTH MAIN	NAIN LINE STOP-UP FLOWING INTO STORM DRAIN	WHITE OAK BAYOU	453-J	TX0057347	20-Mar-00	13:16	84	Gallons
SOUTHWEST QUADRANT	3400 BLALOCK	MAINLINE STOPPED UP	WHITE OAK	450-L	TX0057347	23-Mar-00	10:07	2051	Gallons
NORTHEAST QUADRANT	705 BERRY	MAIN LINE STOPPED UP	WHITE OAK BAYOU	452-G	TX0063053	23-Mar-00	18:23	150	Gallons
NORTHEAST QUADRANT	4001 AVERILL	MAIN LINE STOPPED UP	WHITE OAK BAYOU	453-U	TX0096172	23-Mar-00	17:35	275	Gallons
NORTHWEST QUAD	2536 NORHT GRWY	MAIN LINE STOPPED UP	WHITE OAK BAYOU	453-A	TX0057347	24-Mar-00	20:22	474	Gallons
NORTHWEST Q	513 BARKLEY	SEWER MAIN STOPPAGE	WHITE OAK	453-J	TX0057347	25-Mar-00	7:30	192.5	Gallons
NORTHWEST Q	922 NASHUA	SEWER STOPPED UP	WHITE OAK	492-C	TX0057347	25-Mar-00	7:47	390	Gallons
NORTHWEST QUAD	470 PARKER RD	SEWER MAIN STOPPED UP	WHITE OAK BAYOU	412-Z	TX0051427	25-Mar-00	08:23	1215	Gallons
NORTHWEST QUAD	602 EMLWOOD	MAIN LINE STOPPED UP	WHITE OAK BAYOU	453-S	TX0057347	25-Mar-00	15:21	204	Gallons
NORTH WEST QUAD	1601 AIRLINE AT FITTMAN	MAIN LINE SPED UP BROKEN COMMUNITY LINE..	WHITE OAK BAYOU	453-X	TX0026875	27-Mar-00	20:15	212	Gallons
NORTH EAST QUAD	1919 ANSBURY	MAIN LINE STOPPED UP.	WHITE OAK BAYOU	452-P	TX0096172	27-Mar-00	17:04	220	Gallons
SOUTHWEST QUAD	1700 SEA SPRAY CT.	MAIN LINE STOOPPED UP	WHITE OAK BAYOU	452-X	TX0057347	30-Mar-00	13:30	215	Gallons
NORTHWEST QUADS	9606 PANOLA WAY	MAIN LINE STOPPAGE	WHITE OAK BAYOU	450-X	TX0026875	02-Apr-00	11:26	1482	Gallons
NORTHWEST QUAD	9638 PANOLA WAY	MAINLINE STOPPAGE	WHITE OAK BAYOU	450-X	TX0026875	02-Apr-00	11:20	1518	Gallons
NORTHWEST QUADS	3614 MCKINLEY	ROUTINE STOPPAGE	WHITE OAK BAYOU	411-V	TX0057347	02-Apr-00	14:14	0	UNKNO WN
NORTHWEST QUAD	6335 FRENCH CHATEAU	SEWER MAIN STOPPED UP	WHITE OAK BAYOU	411-T	TX0057347	03-Apr-00	14:20	410	Gallons
NORTHWEST QUAD	4130 DONNA LYNN DR.	MAIN LINE STOPPED UP	WHITE OAK BAYOU	451-L	TX0057347	03-Apr-00	13:58	154	Gallons
NORTHWEST QUAD	9310 LONGPOINT	MAIN LINE STOPPED UP.	WHITE OAK BAYOU	450-Y	TX0026875	04-Apr-00	13:20	1005	Gallons
NORTHEAST QUADS	4001 AVERILL	SERVICE LINE STOPPED UP	WHITE OAK BAYOU	453-Y	TX0096172	04-Apr-00	19:33	1390	Gallons
NORTHWEST QUAD	1709 BENBOW	MAIN LINE STOPPED UP, ROUTINE STOPPAGE	WHITE OAK BAYOU	450-Y	TX0026875	05-Apr-00	8:53	770	Gallons
NORTHWEST QUAD	1322 RUTLAND	ROUTINE STOPPAGE	WHITE OAK BAYOU	452-Z	TX0057347	05-Apr-00	19:06	31	Gallons
NORTHWEST QUAD	10970 FIRECREEK	MAIN LINE STOPPAGE	WHITE OAK BAYOU.	494-T	TX0026875	06-Apr-00	1:08	15.5	Gallons
NORTHWEST QUAD	1125 W. 16TH ST.	MAIN LINE STOPPED UP	WHITE OAK BAYOU	452-Y	TX0026875	07-Apr-00	18:45	990	Gallons
NORTHEAST QUAD	7702 MEADOW YORK	MAIN LINE STOPPED UP	WHITE OAK BAYOU	412-V	TX0057347	07-Apr-00	8:55	173	Gallons
NORTHWEST QUAD	911 W. 11TH ST	MAIN LINE STOPPAGE	WHITE OAK BAYOU	452-Z	TX0057347	07-Apr-00	16:35	470	Gallons
NORTHWEST QUAD	5731 KNOBBY KNOLL	MAIN LINE STOOPPED UP	WHITE OAK BAYOU	451-B	TX0057347	10-Apr-00	8:36	560	Gallons
NORTHWEST QUAD	11099 NORTHWEST FWY	MAIN LINE STOPPED UP.	WHITE OAK BAYOU	451-E	TX0057347	12-Apr-00	9:35	3000	Gallons
NORTHWEST QUAD	1607 AIRLINE	MAIN LINE STOPPED UP	WHITE OAK BAYOU	453-T	TX0057347	13-Apr-00	8:53	652	Gallons
NORTHWEST QUAD	915 W PATTON	MAIN LINE STOPPED UP.	WHITE OAK BAYOU	453-X	TX0057397	13-Apr-00	14:21	116	Gallons
NORTHWEST QUADRANT	1406 JAMES	ROUTINE STOPPAGE	WHITE OAK BAYOU	493-D	TX0057347	15-Apr-00	14:58	297	Gallons
NORTHWEST QUADRANT	7500 PINEMONT	ROUTINE STOPPAGE	WHITE OAK BAYOU	450-H	TX0063011	15-Apr-00	13:25	550	Gallons
NORTHEAST QUAD	7915 STREAMSIDE DR.	MAIN LINE STOPPED UP.	WHITE OAK BAYOU	411-Q	TX0057347	18-Apr-00	9:21	1585	Gallons
NORTHEAST QUAD	11321 BAUMAN	MAIN LINE STOPPED UP	WHITE OAK BAYOU	413-Q	TX0057347	21-Apr-00	20:52	100	Gallons
NORTHWEST QUAD	604 W.11TH	MAIN LINE STOPPED UP	WHITE OAK BAYOU	453-W	TX0057347	22-Apr-00	13:30	1264	Gallons
NORTHEAST QUAD	1108 PASCHALL	COMMUNITY LINE STOPPED UP.	WHITE OAK BAYOU	493-D	TX0026875	25-Apr-00	10:00	90	Gallons
NORTHEAST QUAD	2306 FIRNAT	SERVICE LINE STOPPED UP	WHITE OAK BAYOU	454-E	TX0026875	26-Apr-00	10:00	74	Gallons
NORTHWEST QUAD	4877 LANGFIELD RD	MAINLINE STOPPED UP	WHITE OAK BAYOU	450-H	TX0057347	26-Apr-00	8:19	168	Gallons
NORTHWEST QUAD	5350 W. GULF BANK	SEWER MAIN STOPPED UP	WHITE OAK	411-Q	TX0057347	27-Apr-00	8:53	1500	Gallons
NORTHWEST QUADRANT	5316 ANTOINE	MAIN LINE STOPPED UP	WHITE OAK BAYOU	451-G	TX0057347	03-May-00	14:00	600	Gallons
NORTHWEST QUADRANT	5943 DON WHITE LANE	ROUTINE STOPPAGE	WHITE OAK BAYOU	411-S	TX0057347	03-May-00	12:48	720	Gallons
NORTHWEST QUADRANT	2071 ANTOINE	SEWER SERVICE LINE STOPPED UP	WHITE OAK BAYOU	451-I	TX0057347	03-May-00	10:03	90	Gallons
NORTHWEST QUADRANT	311 E. DELY	SEWER MAIN STOPPED UP	WHITE OAK BAYOU	453-E	TX0057347	05-May-00	11:08	192	Gallons
NORTHWEST QUADRANT	7114 BAYOU FOREST	STOPPAGE IN MAIN LINE OVERFLOWING INTO STORM DRAIN	WHITE OAK BAYOU	411-T	TX0057347	06-May-00	20:17	1662	Gallons
NORTHWEST QUADRANT	1410 GESSNER	SERVICE LINE STOPPED UP	WHITE OAK BAYOU	450-W	TX0057347	09-May-00	13:00	328	Gallons
NORTHWEST QUADS	1707 BENLOW	OPEN JOINT IN SEWER LINE	WHITE OAK BAYOU	450-Y	TX0057347	10-May-00	10:30	3244	Gallons
NORTHWEST QUADRANT	6600 CHATEAU FOREST	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-S	TX0057347	13-May-00	10:24	282	Gallons
NORTHWEST	635 E. 11 1/2	CITY MAIN AND SERVICE LINE STOPPED UP	WHITE OAK BAYOU	453-W	TX0026875	14-May-00	18:18	1356	Gallons
NORTHWEST QUAD	9546 HAMMERLY	MAIN LINE STOPPED UP	WHITE OAK BAYOU	450-T	TX0096172	18-May-00	8:37	363	Gallons
NORTHWEST QUAD	435 FENN	CITY MAIN STOPPED UP	WHITE OAK BAYOU	452-M	TX0057347	19-May-00	8:47	848	Gallons
NORTHEAST QUAD	6618 INWOOD WEST	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-P	TX0096172	19-May-00	10:00	216	Gallons
NORTHWEST QUAD	876 STREY LANE	MAIN LINE STOPPED UP	WHITE OAK BAYOU	490-A	TX0096172	19-May-00	12:15	1950	Gallons
NORTHEAST QUADS	817 GRACELAND	MAIN LINE STOPPED UP	WHITE OAK BAYOU	453-V	TX0057347	20-May-00	13:12	1340	Gallons
NORTHWEST QUADS	406 1/2 GRACELAND	ROUTINE STOPPAGE	WHITE OAK BAYOU	453-U	TX0096172	20-May-00	13:24	5930	Gallons
NORTHWEST QUADS	2811 SOWAY	ROUTINE STOPPAGE (GREASE)	WHITE OAK BAYOU	450-M	TX0026875	21-May-00	08:15	225	Gallons
NORTHWEST QUAD	6414 ACORN FOREST DR.	ROUTINE STOPPAGE	WHITE OAK	411-S	TX0057347	22-May-00	12:59	3016	Gallons
NORTHEAST QUADRANT	406 GRACELAND	MAIN LINE STOPPED UP	WHITE OAK BAYOU	453-W	TX0057347	22-May-00	12:10	620	Gallons
NORTHWEST QUAD	817 GRACE LAND	MAIN LINE STOPPED UP	WHITE OAK	453-V	TX0057347	23-May-00	07:14	145	Gallons
NORTHWEST QUAD	10999 NORTHWEST FREEWAY	MAIN LINE STOPPED UP, SERVICE LINE STOPPED UP	WHITE OAK BAYOU	451-E	TX0057347	23-May-00	12:03	924	Gallons
NORTHWEST QUAD	635 E. 11TH1/2	ROUTINE STOPPAGE	WHITE OAK BAYOU	453-W	TX0096172	24-May-00	12:26	360	Gallons
NORTHWEST QUAD	417 THORTON	MAIN LINE STOPPED UP	WHITE OAK BAYOU	452-M	TX0057347	25-May-00	08:19	1375	Gallons
NORTHWEST QUAD	9204 CAROUSEL LN	MAIN LINE STOPPED UP	WHITE OAK BAYOU	450-Q	TX0057347	26-May-00	08:00	774	Gallons
NORTHEAST QUAD	1115 BAUMAN	SERVICE LINE STOPPED UP	WHITE OAK BAYOU	413-Y	TX0057347	26-May-00	13:45	90	Gallons
NORTHWEST QUADRANT	7915 STREAMSIDE DR.	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-Q	TX0057347	29-May-00	14:23	560	Gallons
NORTHEAST QUAD	602 WARNER	MAIN LINE STOPPED UP	WHITE OAK BAYOU	453-G	TX0057347	01-Jun-00	11:20	732	Gallons
NORTHWEST QUAD	818 PINEMONT	MAIN LINE STOPPAGE	WHITE OAK BAYOU	452-G	TX0057347	09-Jun-00	11:12	170	Gallons
NORTHWEST QUAD	7835 GROW LANE	CITY MAIN AND SERVICE LINE STOPPED UP	WHITE OAK BAYOU	450-D	TX0026875	11-Jun-00	18:49	336	Gallons
NORTHWEST QUAD	OJEMAN & ALCOH	ROUTINE STOPPAGE	WHITE OAK BAYOU	450-R	TX0026875	12-Jun-00	22:55	725	Gallons
NORTHEAST QUAD	5904 RUBERTSON	MAIN LINE STOPPED UP	WHITE OAK BAYOU	453-R	TX0057347	12-Jun-00	10:49	183	Gallons
NORTHWEST QUAD	2917 MANGUM	MAIN LINE STOPPED UP	WHITE OAK BAYOU	451-Q	TX0096172	14-Jun-00	09:50	1608	Gallons
NORTHWEST QUAD	4500 N. MAIN	MAIN LINE STOPPAGE	WHITE OAK BAYOU	453-Y	TX0057347	16-Jun-00	12:01	650	Gallons
NORTHWEST QUAD	4518 OAK SHADOWS	MAIN LINE STOPPED UP	WHITE OAK BAYOU	451-H	TX0096172	19-Jun-00	11:54	390	Gallons
NORTHEAST QUAD	2900 HARDY	OVER FLOW INTO STORM SEWER	WHITE OAK BAYOU	493-D	TX0057347	20-Jun-00	8:35		Gallons
NORTHEAST QUAD	1108 PASCHALL-C/S FULTON	COMMUNITY LINE STOPPED UP	WHITE OAK BAYOU	493-D	TX0057347	20-Jun-00	08:09	258	Gallons
NORTHWEST QUAD	MANGUM & SHERWOOD	MAIN LINE STOPPED UP	WHITE OAK BAYOU	451-R	TX0096172	20-Jun-00	10:49	1026	Gallons
NORTHWEST QUAD	7955 STREAMSIDE	OVERFLOW CAUSING EXCURSION	WHITE OAK BAYOU	411-Q	TX0057347	23-Jun-00	12:20	1100	Gallons

Problem	Location	Description	Receiving stream	Key map	Permit	Date	Time	Volume	Unit
NORTHEAST QUAD	57 PARKER RD.	MAIN LINE STOPPED UP	WHITE OAK BAYOU	413-X	TX0057347	26-Jun-00	12:23	137	Gallons
NORTHWEST QUAD	7107 DEEP FOREST	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-X	TX0057347	28-Jun-00	14:20	440	Gallons
NORTHWEST QUAD	9318 EBLEN	MAIN LINE STOPPED UP	WHITE OAKS BAYOU	410-R	TX0057347	30-Jun-00	13:35	910	Gallons
NORTHWEST QUAD	CHATEAU FOREST & DEIDRE ANNE D	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-S	TX0057347	03-Jul-00	12:20	2740	Gallons
NORTHWEST QUAD	4701 DE MILO	MAIN LINE STOPPED UP	WHITE OAK BAYOU	451-H	TX0063011	03-Jul-00	10:12	860	Gallons
NORTHWEST QUAD	8531 WILD BASIN	SERVICE LINE STOPPED UP	WHITE OAK BAYOU	411-R	TX0096172	05-Jul-00	11:55	830	Gallons
NORTHWEST QUAD	9227 GUYWOOD	MAIN LINE STOPPED UP	WHITE OAK BAYOU	410-V	TX0057347	05-Jul-00	11:50	665	Gallons
NORTHWEST QUAD	1343 YALE ST.	MAIN LINE STOPPED UP	WHITE OAK BAYOU	452-Z	TX0057347	11-Jul-00	11:51	1023	Gallons
NORTHWEST QUAD	1019 MARCELLA	MAIN LINE STOPPED UP	WHITE OAK BAYOU	452-C	TX0057347	12-Jul-00	10:22	4980	Gallons
NORTHWEST QUAD	3219 TILSON	STOPPAGE IN MAIN LINE	WHITE OAK BAYOU	450-L	TX0057347	13-Jul-00	08:38	1380	Gallons
SOUTHEAST QUAD	3926 ARLINGTON SQUARE DR.	OVERFLOW CAUSING EXCURSION	WHITE OAK BAYOU	453-J	TX0057347	14-Jul-00	16:53	43	Gallons
NORTHWEST QUAD	3000 N. LOOP FRWY	STOPPAGE CASUING OVERFLOW	WHITE OAK BAYOU	452-S	TX0057347	14-Jul-00	17:42	560	Gallons
NORTHWEST QUAD	3125 CRESTDOLE & KEMPWOOD	ROUTINE STOPPAGE	WHITE OAK BAYOU	450-K	TX0026875	15-Jul-00	09:58	428	Gallons
NORTHWEST QUADRANT	810 W. 21ST	ROUTINE STOPPAGE	WHITE OAK BAYOU	452-U	TX0057347	17-Jul-00	09:16	598	Gallons
NORTHWEST QUAD	307 E. DELZ	MAIN LINE STOPPED UP	WHITE OAK	453-E	TX0096172	19-Jul-00	10:40	545	Gallons
NORTHWEST QUAD	3000 N. LOOP FRWY	MAIN LINE STOPPED UP	WHITE OAK BAYOU	452-S	TX0096172	21-Jul-00	12:15	375	Gallons
NORTHWEST QUAD	3606 ECHO GROVE LN.	MAIN LINE STOPPED UP	WHITE OAK BAYOU	449-B	TX0026875	24-Jul-00	13:41	1430	Gallons
NORTHWEST QUAD	10655 KATY FREEWAY	MAIN LINE STOPPED UP	WHITE OAK BAYOU	489-C	TX0026875	25-Jul-00	09:30	775	Gallons
NORTHWEST QUAD	4026 BOLIN	MAIN LINE STOPPED UP	WHITE OAK BAYOU	451-K	TX0096172	25-Jul-00	09:05	621	Gallons
NORTHWEST QUADRANT	5005 GEORGI	ROUTINE STOPPAGE	WHITE OAK BAYOU	451-L	TX0057347	27-Jul-00	16:40	300	Gallons
NORTHWEST QUAD	2102 DELERY	MAIN LINE STOPPED UP	WHITE OAK BAYOU	451-P	TX0057347	03-Aug-00	09:31	1530	Gallons
NORTHWEST QUAD	2050 N. LOOP FRWY	MAIN LINE STOPPED UP	WHITE OAK BAYOU	452-S	TX0057347	07-Aug-00	13:14	1815	Gallons
NORTHWEST QUAD	2600 N. SHEPHERD	MAIN LINE STOPPED UP	WHITE OAK	452-V	TX0096172	09-Aug-00	12:53	18.5	Gallons
NORTHWEST QUAD	9001 KEMPWOOD	MAIN LINE STOPPED UP	WHITE OAK BAYOU	450-Q	TX0026875	12-Aug-00	13:54	30	Gallons
NORTHWEST QUAD	1003 WAKEFIELD	MAIN STOPPED UP	WHITE OAK BAYOU	452-P	TX0057347	15-Aug-00	14:20	69	Gallons
SOUTHEAST QUAD	2812 WICHITA ST.	SEWER LINE STOPPED UP	WHITE OAK BAYOU	533-C	TX0057347	16-Aug-00	16:45	750	Gallons
NORTHWEST QUAD	8800 GLENHOUSE	MAIN LINE STOPPED UP	WHITE OAK BAYOU	412-K	TX0057347	20-Aug-00	8:25	950	Gallons
SOUTHWEST QUAD	2015 KIPLING	CITY MAIN STOPPED UP	WHITE OAK BAYOU	492-V	TX0057347	21-Aug-00	17:10	5180	Gallons
NORTHWEST QUAD	3125 CRESTDALE	MAIN LINE STOPPED UP	WHITE OAK BAYOU	450-P	TX0096172	21-Aug-00	11:21	310	Gallons
NORTHWEST QUAD	3502 CAMPBELL RD.	SERVICE LINE STOPPED UP	WHITE OAK BAYOU	450-K	TX0026875	22-Aug-00	8:30	205	Gallons
NORTHWEST QUAD	7224 BROOKSTONE	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-S	TX0057347	23-Aug-00	12:40	387	Gallons
NORTHWEST QUAD	3125 CRESTDALE	MAIN LINE STOPPED UP	WHITE OAK BAYOU	450-K	TX0026875	26-Aug-00	09:00	2100	Gallons
NORTHWEST QUAD	911 W. LITTLE YORK	MAIN LINE STOPPED UP	WHITE OAK BAYOU	413-U	TX0057347	27-Aug-00	19:30	1742	Gallons
NORTHWEST QUAD	2728 W. T.C. JESTER	MAIN LINE STOPPED UP	WHITE OAK BAYOU	452-S	TX0057347	31-Aug-00	10:00	356	Gallons
NORTHEAST QUAD	802 E. BURRESS	SERVICE LINE STOPPED UP	WHITE OAK BAYOU	453-E	TX0057347	06-Sep-00	13:10	30	Gallons
NORTHWEST QUAD	7835 GROW LN.	MAIN STOPPED UP	WHITE OAK	450-D	TX0057347	11-Sep-00	09:36	469	Gallons
NORTHWEST QUAD	7350 TC JESTER BLVD.	MAIN LINE STOPPED UP	WHITE OAK	411-V	TX0096172	18-Sep-00	09:38	310	Gallons
NORTHWEST QUAD	1934 GLOSRIIDGE	MAIN LINE STOPPED UP	WHITE OAK BAYOU	451-S	TX0057347	19-Sep-00	12:35	246	Gallons
NORTHWEST QUADRANT	1137 KEY	MAIN LINE STOPPED UP	WHITE OAK BAYOU	453-W	TX0063011	19-Sep-00	11:45	662	Gallons
NORTHWEST QUAD	10110 BAMBOO RD.	CITY MAIN STOPPED UP GOING INTO STORM DRAIN	WHITE OAK BAYOU	450-A	TX0026875	20-Sep-00	16:55	1650	Gallons
SOUTHEAST QUAD	7800 N. MAIN	MAIN STOPPED UP	WHITE OAK BAYOU	453-N	TX0096172	21-Sep-00	10:42	66	Gallons
NORTHWEST QUAD	9001 KEMPWOOD	MAIN LINE STOPPED UP	WHITE OAK BAYOU	450-L	TX0026875	22-Sep-00	08:37	52	Gallons
NORTHWEST QUADRANT	CHATEAU FOREST@ DEIRDRE ANNE	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-S	TX0054347	23-Sep-00	11:41	291	Gallons
NORTHWEST QUAD	10110 BAMBOO RD	MAIN LINE STOPPAGE	WHITE OAK	450-Q	TX0026875	26-Sep-00	19:53	1310	Gallons
NORTHWEST QUAD	515 LITTLE YORK/NORTH FREEWAY	MAIN LINE STOPPED UP	WHITE OAK BAYOU	412-V	TX0057347	26-Sep-00	14:10	567	Gallons
NORTHWEST QUAD	209 W. 44TH	MAIN LINE STOPPAGE	WHITE OAK BAYOU	452-M	TX0057347	26-Sep-00	18:48	1015	Gallons
NORTHWEST QUAD	5555 HOLLINVIEW	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-Y	TX0057347	29-Sep-00	10:15	1043	Gallons
NORTHWEST QUAD	5714 W. GULF BANK RD.	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-P	TX0063011	02-Oct-00	10:32	525	Gallons
NORTHEAST QUAD	328 VAN MOLAN	MAIN LINE STOPPED UP	WHITE OAK BAYOU	453-L	TX0057347	04-Oct-00	09:15	3136	Gallons
NORTHWEST QUAD	5311 IRVINGTON	MAIN LINE STOPPED UP	WHITE OAK BAYOU	453-V	TX0057347	06-Oct-00	11:44	139	Gallons
NORTHWEST QUAD	1300 W. 43RD	MAIN LINE STOPPED UP	WHITE OAK BAYOU	452-K	TX0096172	10-Oct-00	13:45	80	Gallons
NORTHWEST QUAD	7930 PINEMONT	SEWER MAIN STOPPED UP	WHITE OAK BAYOU	450-H	TX0026875	12-Oct-00	12:46	244	Gallons
NORTHWEST QUAD	1410 GESSNER	CITY MAIN STOPPED UP ALSO SEWER COMING FROM SAMPLE WELL	WHITE OAK BAYOU	450-W	TX0026875	12-Oct-00	20:23	498.5	Gallons
NORTHWEST QUAD	512 THORNTON	MAIN LINE STOPPED UP	WHITE OAK BAYOU	452-M	TX0057347	12-Oct-00	15:30	4200	Gallons
NORTHWEST QUAD	9403 KEMPWOOD	MAIN LINE STOPPAGE	WHITE OAK BAYOU	450-L	TX0026875	13-Oct-00	19:23	834	Gallons
NORTHWEST QUAD	411 W. 23RD ST.	COMMUNITY LINE STOPPED UP	WHITE OAK BAYOU	452-T	TX0057347	16-Oct-00	12:30	118	Gallons
NORTHWEST QUAD	406 BARKLEY	SERVICE LINE STOPPED UP	WHITE OAK BAYOU	453-J	TX0057347	16-Oct-00	08:44	82.5	Gallons
NORTHWEST QUAD	7150 BUSINESS PARK DR.	CITY MAIN OVERFLOWING FROM WASTEWATER VALVE	WHITE OAK BAYOU	409-U	TX0057347	17-Oct-00	15:16	2260	Gallons
NORTHWEST QUAD	7840 BATEMAN	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-P	TX0057347	17-Oct-00	18:11	5940	Gallons
NORTHWEST QUAD	400 REDAN	ROUTINE STOPPAGE	WHITE OAK BAYOU	493-B	TX0057347	19-Oct-00	18:26	430	Gallons
NORTHWEST QUAD	5815 W. LITTLE YORK	MAIN LINE STOPPAGE	WHITE OAK BAYOU	411-X	TX0057347	19-Oct-00	14:30	2310	Gallons
NORTHWEST QUAD	307 E. DELZ	STOPPAGE IN CITY MAIN	WHITE OAK BAYOU	453-E	TX0096172	19-Oct-00	17:01	419	Gallons
NORTHWEST QUAD	1118 WORTSHIRE	ROUTINE STOPPAGE	WHITE OAK BAYOU	452-Y	TX0057347	20-Oct-00	21:43	3078	Gallons
NORTHWEST QUAD	4118 CHERRY OAK	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-U	TX0057347	21-Oct-00	14:34	252	Gallons
NORTHWEST QUAD	11600 KILBURN	SEWER MAIN STOPPED UP	WHITE OAK BAYOU	451-P	TX0057347	21-Oct-00	02:43	7520	Gallons
NORTHWEST QUAD	1400 SPRINGROCK	MAIN LINE STOPPED UP	WHITE OAK BAYOU	450-X	TX0057347	24-Oct-00	09:01	855	Gallons
NORTHWEST QUAD	5639 YALE	MAIN LINE STOPPED UP	WHITE OAK BAYOU	452-D	TX0057347	25-Oct-00	18:45	5755	Gallons
NORTHEAST QUAD	517 CATHER	ROUTINE STOPPAGE	WHITE OAK BAYOU	535-U	TX0057347	26-Oct-00	09:00	1446	Gallons
NORTHWEST QUAD	5555 W. GULFBANK	CITY MAIN STOPPED UP OVERFLOWING INTO MANHOLE	WHITE OAK BAYOU	411-Q	TX0057347	30-Oct-00	08:55	240	Gallons
NORTHEAST QUAD	8521 SCHNEIDER	MAIN LINE STOPPED UP	WHITE OAK BAYOU	453-H	TX0057347	30-Oct-00	13:59	240	Gallons
NORTHWEST QUAD	5698 W. LITTLE YORK	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-Y	TX0057347	31-Oct-00	11:00	270	Gallons
NORTHWEST QUAD	3007 SOWY	MAIN STOPPED UP	WHITE OAK BAYOU	450-R	TX0026875	01-Nov-00	09:00	1200	Gallons
NORTHWEST QUAD	1608 SHEPARD DR.	MAIN STOPPED UP	WHITE OAK BAYOU	492-H	TX0057347	01-Nov-00	10:00	750	Gallons
NORTHWEST QUAD	7635 AMELIA @ COUNTER POINT	MAIN STOPPED UP	WHITE OAK BAYOU	451-T	TX0057347	02-Nov-00	11:00	1545	Gallons
NORTHWEST QUAD	223 WEATHERLEY WAY	OVERFLOW FLOWING INTO DITCH CAUSING EXCURSION	WHITE OAK BAYOU	453-E	TX0057347	04-Nov-00	14:33	585	Gallons
NORTHWEST QUAD	8800 LONG POINT	MAIN STOPPED UP	WHITE OAK BAYOU	450-V	TX0026875	05-Nov-00	08:16	15780	Gallons
NORTHWEST QUAD	9915 INWOOD SHADOWS	STOPPAGE IN MAIN LINE	WHITE OAK BAYOU	411-P	TX0057347	05-Nov-00	10:44	910	Gallons
NORTHWEST QUAD	13806 HEMPSTEAD HWY.	MAIN LINE STOPPED UP	WHITE OAK BAYOU	450-B	TX0026875	07-Nov-00	15:45	900	Gallons
NORTHWEST QUAD	1607 AIRLINE	MAIN LINE STOPPED UP	WHITE OAK BAYOU	453-X	TX0057347	07-Nov-00	07:44	1530	Gallons

Problem	Location	Description	Receiving stream	Key map	Permit	Date	Time	Volume	Unit
NORTHWEST QUAD	7800 GREENE LAWN	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-P	TX0057347	11-Nov-00	11:48	1864	Gallons
NORTHWEST QUAD	6507 VENA JEAN	MAIN LINE STOPPED UP	WHITE OAK BAYOU	411-P	TX0057347	12-Nov-00	12:35	711	Gallons
N/A	N/A	BAYOU BACKED UP CAUSING RESTRICTED FLOW	N/A	373-N	N/A	19-May-00	9:30		
N/A	16500 PARK ROW	EFFLUENT FILTER BACKWASH SYSTEM FAILED,CAUSING FILTER T	N/A	447-Y	TX0026395	29-Sep-00	UNKNO		Gallons
WASTEWATER OPERATION	6301 #1 FUQUA, W.	DIGESTER OVERFILLED&SPILLED SLUDGE ON PLANT GROUND	N/A	571-X	TX0026433	20-Mar-97		2000	Gallons
WASTEWATER OPERATION	10273 GENARD	SLUDGE HAULERS SPILLED SLUDGE WHILE DISCONNECTING	N/A	450-A	TX0026875	30-Jan-96	14:30	50	Gallons
WASTEWATER OPERATION	10273 GENARD	SLUDGE TANK TRUCK HOSE LEAK.	N/A	450-A	TX0026875	05-Feb-96	02:30	50	Gallons
WASTEWATER OPERATION	9610 KINGSPPOINT	DIGESTER UNATTENDED;WASTING OVERFILLING DIGESTER	N/A	576-W	TX0035009	08-Feb-96	11:10	1000	Gallons
WASTEWATER OPERATION	9610 KINGSPPOINT	DIGESTER SPILL DUE TO THE PLANT OPERATOR.	N/A	576-W	TX0035009	04-Dec-97	05:00	3000	Gallons
WASTEWATER OPERATION	13702 TRAILVILLE	DIGESTER OVERFLOW DUE TO HEAVY RAINFALL IN AREA.	N/A	488-G	TX0058068	28-Jan-97	03:00	5000	Gallons
N/A	255 ISOLDE	SYNAGRO WHO'S CLEANING SLUDGE/GRIT FROM AERATION BASINS	N/A	489-L	TX0063002	26-Sep-00	10:00	20	YDS.
WASTEWATER OPERATION	655 MAXEY ROAD	10"DISCHARGE HOSE NOT HOOKEDUP AERATION-SEWAGESPIL	N/A	496-G	TX0063037	09-May-97	17:30	300000	Gallons
N/A	7410 OLD GALVESTON RD	4" (TEMP) SLUDGE LINE BROKE	N/A	576-F	TX0063045	06-Feb-00	16:00	68000	Gallons
Wastewater Operation	8219 Kellett	Sludge spill, Clarifier # 1, Air Lift Too High	N/A	455-G	Tx0063053	29-Nov-97	un:kn	2000	Gallons
N/A	11700 SAGEARBOR	MECH. JOINT CAME LOOSE ON THE FLUGDE WATER PUMP DISC.	N/A	576-Z	TX0063070	21-Jan-00	07:20	5000	Gallons
WASTEWATER OPERATION	10518 BELLAIRE	CONTRACTOR DROVE OVER & DAMAGED A TEMP.4" SLUDGE	N/A	529-G	TX0065307	04-Feb-97	13:30	500	Gallons
N/A	22 DEER RIDGE ESTATES BLVD.	LIFT STATION OVERFLOWED DUE TO BREAKERS TRIPPING ON LP	N/A	336-G	TX0066583	29-Nov-99	06:00	200	Gallons
N/A	3928 KINGWOOD DR.	LEAK ON SCUM PUMP DISCHARGE LINE, LEAKAGE	N/A	337-V	TX0066583	29-Dec-99	05:00	500	Gallons
N/A	3928 KINGWOOD DR	LEAK DEVELOPED IN SCUM PUMP, NEAR REPAIRED CLAMP	N/A	337-F	TX0066583	06-Jan-00	12:00	1000	Gallons
KINGWOOD CENTRAL WWTP	4545 KINGWOOD DR.	RAW SEWER BACKED UP FROM MANHOLE WHEN POWER WENT OUT	N/A	337-B	TX0066583	20-May-00	2:00	2000	Gallons
N/A	2910 ROYAL CIRCLE	LIFT PUMP OVERLOADS;TRIPPED AND MILTRONICS FAILED AND M	N/A	336-D	TX0066583	12-Aug-00	20:00	1000	Gallons
	4500 KINGWOOD DRIVE	FORCE MAIN FROM TRAIL RIVER LIFT STATION DEVELOPED A LE	N/A	337-C	TX0066583	19-Sep-00	10:00	2000	Gallons
N/A	4722 ALDINE BENDER	BAR SCREEN CLOGGED	N/A	374-Y	TX0090166	10-Jan-00	UNK	600	Gallons
WASTEWATER OPERATION	3700 HIRSCH ROAD	A 24" FORCE MAIN WAS LEAKING AT 3700 HIRSCH ROAD.	N/A	494-J	TX0096172	05-Nov-96	13:00	50	Gallons
N/A	2200 HUFFMAN EASTGATE	FORCE MAIN LEAK	N/A	339-G	TX0103667	02-Jan-00	11:45		
WASTEWATER OPERATION	3005 GALVESTON ROAD	BARSCREEN CLOGGEDUP,SUBSEQUENTLY OVERFLOW ONGROUND	N/A	535-L	TX0105058	12-May-97			Undeter mined
N/A	8209 GULF FREEWAY	CONTRACTOR TURNED PUMPS OFF TO REPLACE CHECK VALVES.	N/A	535-T	TX0105058	22-Feb-00	13:55	200	Gallons
WASTEWATER OPERATION	13702 TRAILVILLE DRIVE	HYDRAULIC OVERLOAD CAUSED DIGESTER TO OVERFLOW.	NONE	488-F	TX0058068	29-Aug-96	03:00	2000	Gallons
WASTEWATER OPERATION	1/2 W. OF 11000 BLK WOODFOREST	AIR RELIEF MALFUNCTION ON THE EXCESS SLUDGE LINE	NONE	496-B	TX0063037			1.01	MILLION GAL.
WASTEWATER OPERATIONS	10518 BELLAIRE	THICKNER WAS FULL OF SCUM PLUGGED UP DISCHARGE.	NONE	529-G	TX0065307	10-Jan-98	15:00	400	Gallons

Table C-2 Individual Permit Database

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
tnrcweb	16056	06-Aug-96	31613		1400		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	20125	14-Oct-97	31613		27000		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	22801	25-Feb-98	31613		1800		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	23084	18-May-98	31613		1100		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	U097989	03-Aug-98	31625		310		11345	00-Jan-00	0.3			0					GS	GS	
tnrcweb	23684	06-Aug-98	31613	>	60000		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	U097990	22-Aug-98	31625		11000		11345	00-Jan-00	0.3			0					GS	GS	
tnrcweb	24955	05-Nov-98	31613		1700		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	24957	10-Feb-99	31613		760		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	25972	05-May-99	31613		4000		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	27701	03-Aug-99	31613		330		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	U097972	03-Aug-98	31625		500		11351	00-Jan-00	0.3			0					GS	GS	
tnrcweb	U097973	22-Aug-98	31625		190		11351	00-Jan-00	0.3			0					GS	GS	
tnrcweb	16061	06-Aug-96	31613		700		11358	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	U097968	03-Aug-98	31625		2200		11360	00-Jan-00	0.3			0					GS	GS	
tnrcweb	U097970	22-Aug-98	31625		3300		11360	00-Jan-00	0.3			0					GS	GS	
tnrcweb	16055	06-Aug-96	31613		2700		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	20126	14-Oct-97	31613		5500		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	22802	25-Feb-98	31613		1200		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	23685	06-Aug-98	31613		250		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	24845	05-Nov-98	31613		340		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	25989	10-Feb-99	31613		2650		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	26952	05-May-99	31613		900		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	U097974	15-Feb-94	31625		4200		11387	00-Jan-00	0.3			0					GS	GS	
tnrcweb	U097975	03-May-94	31625		6000		11387	00-Jan-00	0.3			0					GS	GS	
tnrcweb	U097976	02-Aug-94	31625		680		11387	00-Jan-00	0.3			0					GS	GS	
tnrcweb	U097977	13-Mar-95	31625		19000		11387	00-Jan-00	0.3			0					GS	GS	
tnrcweb	U097978	22-May-95	31625		520		11387	00-Jan-00	0.3			0					GS	GS	
tnrcweb	U097979	03-Aug-95	31625		1900		11387	00-Jan-00	0.3			0					GS	GS	
tnrcweb	U097980	27-Feb-96	31625		2500		11387	00-Jan-00	0.3			0					GS	GS	
tnrcweb	U097981	29-May-96	31625		4100		11387	00-Jan-00	0.3			0					GS	GS	
tnrcweb	16062	06-Aug-96	31613		60000		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	U097982	26-Aug-96	31625		6700		11387	00-Jan-00	0.3			0					GS	GS	
tnrcweb	U097983	26-Feb-97	31625		2800		11387	00-Jan-00	0.3			0					GS	GS	
tnrcweb	U097984	14-May-97	31625		2800		11387	00-Jan-00	0.3			0					GS	GS	
tnrcweb	U097985	18-Aug-97	31625		750		11387	00-Jan-00	0.3			0					GS	GS	
tnrcweb	20130	14-Oct-97	31613		23000		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	U097986	02-Feb-98	31625		7700		11387	00-Jan-00	0.3			0					GS	GS	
tnrcweb	22806	25-Feb-98	31613		18000		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	U097987	18-May-98	31625		7000		11387	00-Jan-00	0.3			0					GS	GS	
tnrcweb	23596	06-Aug-98	31613		53000		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	U097988	11-Aug-98	31625		2300		11387	00-Jan-00	0.3			0					GS	GS	
tnrcweb	24956	05-Nov-98	31613		4800		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	25992	10-Feb-99	31613		5000		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	26957	05-May-99	31613		1000		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	27706	03-Aug-99	31613		1700		11387	00-Jan-00	0.3			0					WC	FO	RT
rwqmdata	I000461	21-Jan-98	31616		600		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000462	09-Feb-98	31616		380		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000809	13-Jul-98	31616		3700		11361	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000810	17-Aug-98	31616		3500		11361	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000811	21-Sep-98	31616		280		11361	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000812	12-Oct-98	31616		700		11361	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000813	02-Nov-98	31616		7200		11361	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000814	16-Dec-98	31616		170		11361	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000815	04-Feb-98	31616		1200		11354	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000816	23-Mar-98	31616		4800		11354	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000817	13-Apr-98	31616		2100		11354	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000818	11-May-98	31616		140		11354	00-Jan-00	0.3								HG	HP	RT

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
rwqmdata	I000819	03-Jun-98	31616		440		11354	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000820	13-Jul-98	31616		2000		11354	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000821	17-Aug-98	31616		9200		11354	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000822	21-Sep-98	31616		400		11354	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000823	12-Oct-98	31616		580		11354	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000824	02-Nov-98	31616		40000		11354	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000825	16-Dec-98	31616		2600		11354	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001005	13-Feb-98	31616		570		11390	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001006	18-May-98	31616		7400		11390	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001007	17-Jul-98	31616		2900		11390	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000463	02-Mar-98	31616		250		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000464	01-Apr-98	31616		4500		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000465	04-May-98	31616		230		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000466	08-Jun-98	31616		20000		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000467	22-Jul-98	31616		450		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000468	05-Aug-98	31616		2100		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000469	16-Oct-98	31616		3300		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000470	04-Nov-98	31616		480		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000471	08-Jun-98	31616		8900		15826	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000472	22-Jul-98	31616		23000		15826	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000473	05-Aug-98	31616		1700		15826	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000474	08-Sep-98	31616		29000		15826	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000475	16-Oct-98	31616		7100		15826	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000476	04-Nov-98	31616		400		15826	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000477	09-Dec-98	31616		860		15826	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000551	04-Feb-98	31616		350		11353	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000552	23-Mar-98	31616		25000		11353	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000553	13-Apr-98	31616		2200		11353	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000554	11-May-98	31616		99		11353	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000555	03-Jun-98	31616		470		11353	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000556	13-Jul-98	31616		1900		11353	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000557	17-Aug-98	31616		3700		11353	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000558	21-Sep-98	31616		430		11353	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000559	12-Oct-98	31616		590		11353	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000560	02-Nov-98	31616		8600		11353	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000561	16-Dec-98	31616		1000		11353	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000562	12-Oct-98	31616		780		15844	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000563	02-Nov-98	31616		33000		15844	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000564	16-Dec-98	31616		1200		15844	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000566	04-Feb-98	31616		700		15844	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000567	23-Mar-98	31616		33000		15844	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000568	13-Apr-98	31616		30000		15844	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000569	11-May-98	31616		140		15844	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000570	03-Jun-98	31616		2700		15844	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000571	13-Jul-98	31616		2000		15844	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000572	17-Aug-98	31616		5800		15844	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000573	04-Feb-98	31616		1200		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000574	23-Mar-98	31616		30000		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000575	13-Apr-98	31616		37000		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000576	11-May-98	31616		210		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000577	03-Jun-98	31616		2400		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000578	13-Jul-98	31616		3000		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000579	17-Aug-98	31616		3900		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000580	21-Sep-98	31616		660		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000581	12-Oct-98	31616		570		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000582	02-Nov-98	31616		16000		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000583	16-Dec-98	31616		910		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000584	04-Feb-98	31616		980		15846	00-Jan-00	0.3								HG	HP	RT

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
rwqmdata	I000585	23-Mar-98	31616		380		15846	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000586	13-Apr-98	31616		410		15846	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000587	11-May-98	31616		390		15846	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000588	03-Jun-98	31616		540		15846	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000589	13-Jul-98	31616		1600		15846	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000590	17-Aug-98	31616		8200		15846	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000591	21-Sep-98	31616		490		15846	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000592	12-Oct-98	31616		840		15846	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000593	02-Nov-98	31616		4800		15846	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000594	16-Dec-98	31616		27		15846	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000595	04-Feb-98	31616		380		15845	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000596	23-Mar-98	31616		7000		15845	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000597	13-Apr-98	31616		480		15845	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000598	11-May-98	31616		160		15845	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000599	03-Jun-98	31616		470		15845	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000600	13-Jul-98	31616		1600		15845	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000601	17-Aug-98	31616		5800		15845	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000602	21-Sep-98	31616		460		15845	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000603	12-Oct-98	31616		850		15845	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000604	02-Nov-98	31616		24000		15845	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000605	16-Dec-98	31616		750		15845	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000606	04-Feb-98	31616		170		11362	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000607	23-Mar-98	31616		6700		11362	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000608	13-Apr-98	31616		340		11362	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000609	11-May-98	31616		580		11362	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000610	03-Jun-98	31616		260		11362	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000611	13-Jul-98	31616		3000		11362	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000612	17-Aug-98	31616		4400		11362	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000613	21-Sep-98	31616		850		11362	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000614	12-Oct-98	31616		680		11362	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000615	02-Nov-98	31616		30000		11362	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000616	16-Dec-98	31616		36		11362	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000617	04-Feb-98	31616		300		11363	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000618	23-Mar-98	31616		180		11363	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000619	13-Apr-98	31616		260		11363	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000620	11-May-98	31616		760		11363	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000621	03-Jun-98	31616		260		11363	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000622	13-Jul-98	31616		770		11363	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000623	17-Aug-98	31616		2200		11363	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000624	21-Sep-98	31616		170		11363	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000625	12-Oct-98	31616		300		11363	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000626	02-Nov-98	31616		5600		11363	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000627	16-Dec-98	31616		18		11363	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000628	04-Feb-98	31616		400		11359	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000629	23-Mar-98	31616		670		11359	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000630	13-Apr-98	31616		410		11359	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000631	11-May-98	31616		790		11359	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000632	03-Jun-98	31616		480		11359	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000633	13-Jul-98	31616		3300		11359	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000634	17-Aug-98	31616		7600		11359	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000635	21-Sep-98	31616		390		11359	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000636	12-Oct-98	31616		830		11359	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000637	02-Nov-98	31616		21000		11359	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000638	16-Dec-98	31616		63		11359	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000649	04-Feb-98	31616		380		11364	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000650	23-Mar-98	31616		27		11364	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000651	13-Apr-98	31616		155		11364	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000652	11-May-98	31616		720		11364	00-Jan-00	0.3								HG	HP	RT

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
rwqmdata	I000653	03-Jun-98	31616		235		11364	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000654	13-Jul-98	31616		375		11364	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000655	17-Aug-98	31616		3100		11364	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000656	21-Sep-98	31616		220		11364	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000657	12-Oct-98	31616		730		11364	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000658	02-Nov-98	31616		4800		11364	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000682	23-Mar-98	31616		42000		11345	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000683	13-Apr-98	31616		49000		11345	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000684	11-May-98	31616		1700		11345	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000685	13-Jul-98	31616		29000		11345	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000696	17-Aug-98	31616		3900		11345	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000697	21-Sep-98	31616		810		11345	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000698	12-Oct-98	31616		390		11345	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000699	02-Nov-98	31616		40000		11345	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000700	16-Dec-98	31616		650		11345	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000701	03-Jun-98	31616		2700		11345	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000749	04-Feb-98	31616		2900		15843	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000750	23-Mar-98	31616		21000		15843	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000751	13-Apr-98	31616		41000		15843	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000752	11-May-98	31616		1400		15843	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000753	03-Jun-98	31616		1600		15843	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000754	13-Jul-98	31616		36000		15843	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000755	17-Aug-98	31616		6000		15843	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000756	21-Sep-98	31616		680		15843	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000757	12-Oct-98	31616		580		15843	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000758	02-Nov-98	31616		43000		15843	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000759	16-Dec-98	31616		980		15843	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000760	04-Feb-98	31616		910		11357	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000761	23-Mar-98	31616		4100		11357	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000762	13-Apr-98	31616		450		11357	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000763	11-May-98	31616		160		11357	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000764	03-Jun-98	31616		440		11357	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000765	13-Jul-98	31616		3800		11357	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000766	17-Aug-98	31616		3800		11357	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000767	21-Sep-98	31616		500		11357	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000768	12-Oct-98	31616		600		11357	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000769	02-Nov-98	31616		23000		11357	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000770	16-Dec-98	31616		160		11357	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000793	04-Feb-98	31616		800		11360	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000794	23-Mar-98	31616		600		11360	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000795	13-Apr-98	31616		390		11360	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000796	11-May-98	31616		820		11360	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000797	03-Jun-98	31616		1200		11360	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000798	13-Jul-98	31616		2500		11360	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000799	17-Aug-98	31616		4100		11360	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000800	21-Sep-98	31616		350		11360	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000801	12-Oct-98	31616		2300		11360	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000802	02-Nov-98	31616		44000		11360	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000803	16-Dec-98	31616		130		11360	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000804	04-Feb-98	31616		760		11361	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000805	23-Mar-98	31616		920		11361	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000806	13-Apr-98	31616		370		11361	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000807	11-May-98	31616		760		11361	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000808	03-Jun-98	31616		340		11361	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001008	02-Sep-98	31616		3400		11390	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001009	13-Feb-98	31616		520		15829	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001010	18-May-98	31616		960		15829	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001011	17-Jul-98	31616		5600		15829	00-Jan-00	0.3								HG	HP	RT

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
rwqmdata	I001012	02-Sep-98	31616		2200		15829	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001013	17-Jul-98	31616		4700		15826	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001014	02-Sep-98	31616		5200		15826	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001017	13-Feb-98	31616		2200		15825	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001018	18-May-98	31616		8600		15825	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001019	17-Jul-98	31616		5700		15825	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001020	02-Sep-98	31616		4900		15825	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001021	13-Feb-98	31616		590		11391	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001022	18-May-98	31616		11000		11391	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001023	17-Jul-98	31616		3300		11391	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001024	02-Sep-98	31616		11000		11391	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001040	13-Feb-98	31616		680		15826	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001041	18-May-98	31616		11000		15826	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001046	13-Feb-98	31616		500		15831	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001047	18-May-98	31616		580		15831	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001048	17-Jul-98	31616		830		15831	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001049	02-Sep-98	31616		790		15831	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001050	13-Feb-98	31616		600		15830	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001051	18-May-98	31616		600		15830	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001052	17-Jul-98	31616		4000		15830	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001053	02-Sep-98	31616		2100		15830	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I003288	08-Feb-99	31616		12000		15843	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I003544	09-Dec-98	31616		8900		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I003546	16-Dec-98	31616		18		11364	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001015	13-Feb-98	31616		2900		16636	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001016	18-May-98	31616		22000		16636	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001025	13-Feb-98	31616		780		16646	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001026	18-May-98	31616		4000		16646	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001028	02-Sep-98	31616		5500		16646	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001042	13-Feb-98	31616		770		16637	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001043	18-May-98	31616		35000		16637	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001044	17-Jul-98	31616		4100		16637	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001045	02-Sep-98	31616		3500		16637	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001054	17-Jul-98	31616		7600		16636	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I001055	02-Sep-98	31616		6000		16636	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000478	21-Jan-98	31616		6800		16636	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000479	09-Feb-98	31616		5400		16636	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000480	02-Mar-98	31616		200		16636	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000481	01-Apr-98	31616		25000		16636	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000482	04-May-98	31616		6700		16636	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000639	23-Mar-98	31616		26000		16647	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000640	13-Apr-98	31616		47000		16647	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000641	11-May-98	31616		1900		16647	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000642	13-Jul-98	31616		20000		16647	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000643	17-Aug-98	31616		4900		16647	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000644	21-Sep-98	31616		2100		16647	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000645	12-Oct-98	31616		8500		16647	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000646	02-Nov-98	31616		28000		16647	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000647	16-Dec-98	31616		4300		16647	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000648	03-Jun-98	31616		2100		16647	00-Jan-00	0.3							Green color observed.	HG	HP	RT
rwqmdata	I000670	04-Feb-98	31616		590		11163	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000671	23-Mar-98	31616		230		11163	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000672	13-Apr-98	31616		210		11163	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000673	11-May-98	31616		2900		11163	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000674	03-Jun-98	31616		200		11163	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000675	17-Aug-98	31616		3400		11163	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000676	21-Sep-98	31616		240		11163	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000677	12-Oct-98	31616		150		11163	00-Jan-00	0.3								HG	HP	RT

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
rwqmdata	I000678	02-Nov-98	31616		430		11163	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000679	16-Dec-98	31616		45		11163	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000771	04-Feb-98	31616		240		15847	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000772	23-Mar-98	31616		130		15847	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000773	13-Apr-98	31616		300		15847	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000774	11-May-98	31616		290		15847	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000775	03-Jun-98	31616		950		15847	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000776	13-Jul-98	31616		2400		15847	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000777	17-Aug-98	31616		2700		15847	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000778	21-Sep-98	31616		210		15847	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000779	12-Oct-98	31616		5000		15847	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000780	02-Nov-98	31616		36000		15847	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I000781	16-Dec-98	31616		910		15847	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I003270	08-Feb-99	31616		220		11163	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I003272	08-Feb-99	31616		90		15847	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I003545	04-Feb-98	31616		2800		16647	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I003577	15-Jan-99	31616		7200		11347	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003578	29-Jan-99	31616		2100		11347	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003579	15-Jan-99	31616		3500		11351	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003580	19-Jan-99	31616		1500		11356	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003581	19-Jan-99	31616		4400		11360	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003634	15-Jan-99	31616	>	200000		16648	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003635	29-Jan-99	31616		13000		16648	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003643	15-Jan-99	31616		510		11387	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003644	29-Jan-99	31616		9700		11387	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003815	08-Jan-99	31616	>	200000		16595	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003816	22-Jan-99	31616		11000		16595	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003817	08-Jan-99	31616		43000		16594	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003818	22-Jan-99	31616		47000		16594	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003819	08-Jan-99	31616		31000		16593	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003820	25-Jan-99	31616		540		16593	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003823	15-Jan-99	31616		14000		16675	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003825	29-Jan-99	31616	>	200000		16675	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003826	08-Jan-99	31616		1100		16591	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003827	25-Jan-99	31616		120		16591	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003828	19-Jan-99	31616		2800		11188	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003829	19-Jan-99	31616		72		15847	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003830	19-Jan-99	31616		150		11163	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003833	25-Jan-99	31616		130		16592	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003834	25-Jan-99	31616		130		16597	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003931	10-Feb-99	31616		5300		11387	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003932	15-Feb-99	31616		3000		11387	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003933	22-Feb-99	31616		2000		11387	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003936	05-Feb-99	31616		1200		16595	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003937	22-Feb-99	31616		120000		16595	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I005496	22-Feb-99	31616		690		16594	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003938	05-Feb-99	31616		1500		16593	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003939	22-Feb-99	31616		72000		16593	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003940	11-Feb-99	31616		31000		16648	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003941	15-Feb-99	31616		5600		16648	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I003942	22-Feb-99	31616		2300		16648	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004011	15-Feb-99	31616		2500		11347	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004012	22-Feb-99	31616		2300		11347	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004013	10-Feb-99	31616		92000		16675	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004014	15-Feb-99	31616		4200		16675	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004015	22-Feb-99	31616		3700		16675	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004017	03-Feb-99	31616		2000		16591	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004019	22-Feb-99	31616		2200		16591	00-Jan-00	0.3								HG	HH	RT

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
rwqmdata	I004020	01-Feb-99	31616		500		11188	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004021	08-Feb-99	31616		1800		11188	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004022	17-Feb-99	31616		54000		11188	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004023	24-Feb-99	31616		9400		11188	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004025	01-Feb-99	31616		440		15847	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004026	08-Feb-99	31616		81		15847	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004027	17-Feb-99	31616		15000		15847	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004028	24-Feb-99	31616		180		15847	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004029	01-Feb-99	31616		370		11163	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004030	08-Feb-99	31616	<	10		11163	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004031	17-Feb-99	31616		1300		11163	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004032	24-Feb-99	31616		220		11163	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004035	03-Feb-99	31616		260		16592	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004036	10-Feb-99	31616		850		16592	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004037	17-Feb-99	31616		58000		16592	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004038	24-Feb-99	31616		120000		16592	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004039	03-Feb-99	31616		710		16597	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004040	10-Feb-99	31616		380		16597	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004041	24-Feb-99	31616		950		16597	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I005497	10-Feb-99	31616		12000		11351	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004043	15-Feb-99	31616		4300		11351	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004044	22-Feb-99	31616		3600		11351	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004045	01-Feb-99	31616		1500		11356	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004046	03-Feb-99	31616		860		11356	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004047	17-Feb-99	31616		100000		11356	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004048	24-Feb-99	31616		450		11356	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004049	01-Feb-99	31616		4800		11360	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004050	08-Feb-99	31616		7500		11360	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004051	17-Feb-99	31616		16000		11360	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004052	24-Feb-99	31616		860		11360	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004053	01-Feb-99	31616		300		11364	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004054	08-Feb-99	31616		370		11364	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004055	17-Feb-99	31616		750		11364	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I004056	24-Feb-99	31616		230		11364	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I005832	12-Apr-99	31616		3500		15843	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I005857	17-May-99	31616		100		15843	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I005881	07-Jun-99	31616		4300		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I005883	07-Jun-99	31616		830		15843	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I005907	23-Aug-99	31616		1800		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I005909	23-Aug-99	31616		1400		15843	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I005503	23-Jul-99	31616		3500		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I005577	14-Jun-99	31616		2800		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I005578	14-Jun-99	31616		9000		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I005594	21-Sep-99	31616		21000		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I005607	25-Aug-99	31616		7100		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I005608	25-Aug-99	31616		6000		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I005727	12-Jul-99	31616		2200		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I005729	12-Jul-99	31616		2000		15843	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I005807	08-Mar-99	31616		12000		15843	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I005934	27-Sep-99	31616		3300		11351	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I005936	27-Sep-99	31616		2200		15843	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I006340	16-Jul-99	31616		7400		15825	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I006341	16-Jul-99	31616		4800		16647	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I006354	09-Apr-99	31616		22000		15825	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I006355	09-Apr-99	31616		9800		16647	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I006368	26-May-99	31616		860		15825	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I006369	26-May-99	31616		700		16647	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I006381	21-Jun-99	31616		9000		15825	00-Jan-00	0.3								HG	HP	RT

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
rwqmdata	I006382	21-Jun-99	31616		15000		16647	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I006395	05-Aug-99	31616		290		15825	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I006396	05-Aug-99	31616		590		16647	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I006409	15-Sep-99	31616		5200		15825	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I006410	15-Sep-99	31616		2400		16647	00-Jan-00	0.3								HG	HP	RT
rwqmdata	I009099	01-Mar-99	31616		69000		16675	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I009100	08-Mar-99	31616		21000		16675	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I009101	15-Mar-99	31616		3400		16675	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I009103	07-Apr-99	31616	>	200000		16675	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I009104	29-Apr-99	31616		120000		16675	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I009105	05-May-99	31616		21000		16675	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I009106	11-May-99	31616		21000		16675	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I009107	19-May-99	31616		31000		16675	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I009108	26-May-99	31616		41000		16675	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I009109	14-Jun-99	31616		2300		16675	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I009110	29-Jun-99	31616		7000		16675	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I009236	08-Jun-99	31616		15000		11351	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I009237	14-Jun-99	31616		4700		11351	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I009238	17-Jun-99	31616		6500		11351	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I009239	23-Jun-99	31616		5300		11351	00-Jan-00	0.3								HG	HH	RT
rwqmdata	I009240	29-Jun-99	31616		800		11351	00-Jan-00	0.3								HG	HH	RT
swqm10	1311	03-Aug-92	31616		92000		11345	00-Jan-00	0.3								WC	FO	RT
swqm10	1312	03-Aug-92	31616	>	60000		11351	00-Jan-00	0.3								WC	FO	RT
swqm10	1313	03-Aug-92	31616		107000		11388	00-Jan-00	0.3								WC	FO	RT
swqm10	1314	03-Aug-92	31616		74000		11362	00-Jan-00	0.3								WC	FO	RT
swqm10	1315	03-Aug-92	31616		60000		11398	00-Jan-00	0.15								WC	FO	RT
swqm10	1441	19-Nov-92	31616		37000		11345	00-Jan-00	0.3								WC	FO	RT
swqm10	1442	19-Nov-92	31616		1500		11362	00-Jan-00	0.15								WC	FO	RT
swqm10	1447	19-Nov-92	31616		2300		11354	00-Jan-00	0.3								WC	FO	RT
swqm10	1448	19-Nov-92	31616		8000		11387	00-Jan-00	0.15								WC	FO	RT
swqm10	1449	17-Nov-92	31616		115		11398	00-Jan-00	0.15								WC	FO	RT
swqm10	U010851	26-Feb-92	31625		2700		11387	00-Jan-00	0.3								GS	GS	
swqm10	U010852	11-May-92	31625		820		11387	00-Jan-00	0.3								GS	GS	
swqm10	U010853	04-Aug-92	31625		2600		11387	00-Jan-00	0.3								GS	GS	
swqm10	X010019	06-Feb-92	31616		220		11362	00-Jan-00	0.3			0				WATER YELLOW-GREENISH B	WC	FO	RT
swqm10	X010020	06-Feb-92	31616		590		11398	00-Jan-00	0.15			0				WATER YELLOWISH-GREEN V	WC	FO	RT
swqm10	X010023	24-Feb-92	31616		4000		11345	00-Jan-00	0.3			0				WATER BROWN WITH SOME T	WC	FO	RT
swqm10	X010024	24-Feb-92	31616		105000		11351	00-Jan-00	0.3			0				WATER BROWN WITH DEBRIS	WC	FO	RT
swqm10	X010025	24-Feb-92	31616		56000		11388	00-Jan-00	0.3			0				WATER BROWN WITH MUCH I	WC	FO	RT
swqm10	X011037	26-May-92	31616		13000		11351	00-Jan-00	0.3			0				WATER BROWN, OVERCAST S	WC	FO	RT
swqm10	X011038	26-May-92	31616		6000		11388	00-Jan-00	0.3			0				WATER GREEN, OVERCAST SK	WC	FO	RT
swqm10	X011039	26-May-92	31616		60		11362	00-Jan-00	0.3			0				WATER GREEN, SKY OVERCA	WC	FO	RT
swqm10	X011040	26-May-92	31616		450		11398	00-Jan-00	0.3			0				WATER BROWN, OVERCAST S	WC	FO	RT
tnrccweb	2759	04-Feb-93	31616		110		11398	00-Jan-00	0.15			0					WC	FO	RT
tnrccweb	2764	11-Feb-93	31616		9000		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrccweb	2765	11-Feb-93	31616		10000		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrccweb	2774	11-Feb-93	31616		13000		11354	00-Jan-00	0.3			0					WC	FO	RT
tnrccweb	2775	11-Feb-93	31616		10000		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrccweb	2919	13-May-93	31616		305		11398	00-Jan-00	0.15			0					WC	FO	RT
tnrccweb	2924	20-May-93	31616		6800		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrccweb	2925	20-May-93	31616		630		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrccweb	2931	20-May-93	31616		4700		11354	00-Jan-00	0.3			0					WC	FO	RT
tnrccweb	2932	20-May-93	31616		3400		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrccweb	3809	25-Aug-93	31616		620		11398	00-Jan-00	0.3			0					WC	FO	RT
tnrccweb	3814	16-Aug-93	31616		20000		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrccweb	3816	16-Aug-93	31616		5800		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrccweb	3821	16-Aug-93	31616		2300		11354	00-Jan-00	0.3			0					WC	FO	RT
tnrccweb	3822	16-Aug-93	31616		2450		11387	00-Jan-00	0.3			0					WC	FO	RT

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
tnrcweb	4791	09-Nov-93	31616	>	60000		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	7159	08-Feb-94	31616		60000		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	7160	08-Feb-94	31616		1050		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	I005872	07-Jun-99	31616		1300		11359	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005873	07-Jun-99	31616		860		15846	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005874	07-Jun-99	31616		7100		11357	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005875	07-Jun-99	31616		590		15845	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005876	07-Jun-99	31616		1500		11354	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005877	07-Jun-99	31616		860		11353	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005885	07-Jun-99	31616		610		11345	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005890	23-Aug-99	31616		730		11364	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005892	23-Aug-99	31616		270		11363	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005894	23-Aug-99	31616		2300		11362	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005895	23-Aug-99	31616		2700		11361	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005897	23-Aug-99	31616		1500		11360	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005898	23-Aug-99	31616		2300		11359	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005899	23-Aug-99	31616		1200		15846	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005900	23-Aug-99	31616		1200		11357	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005901	23-Aug-99	31616		230		15845	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005902	23-Aug-99	31616		220		11354	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005903	23-Aug-99	31616		250		11353	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005911	23-Aug-99	31616		670		11345	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005917	27-Sep-99	31616		120		11364	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005919	27-Sep-99	31616		99		11363	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005921	27-Sep-99	31616		180		11362	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005922	27-Sep-99	31616		2100		11361	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005924	27-Sep-99	31616		2200		11360	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005925	27-Sep-99	31616		840		11359	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005926	27-Sep-99	31616		100		15846	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005927	27-Sep-99	31616		180		11357	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005928	27-Sep-99	31616		170		15845	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005929	27-Sep-99	31616		150		11354	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005930	27-Sep-99	31616		160		11353	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005938	27-Sep-99	31616		14000		11345	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006330	16-Jul-99	31616		2500		15831	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006331	16-Jul-99	31616		880		15830	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006332	16-Jul-99	31616		970		11390	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006333	16-Jul-99	31616		1200		11390	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006334	16-Jul-99	31616		2100		11391	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006335	16-Jul-99	31616		3100		16637	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006337	16-Jul-99	31616		2200		15826	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006344	09-Apr-99	31616		820		15831	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006345	09-Apr-99	31616		1200		15830	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006346	09-Apr-99	31616		973		11390	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006347	09-Apr-99	31616		4000		11390	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006348	09-Apr-99	31616		3200		11391	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006349	09-Apr-99	31616		32000		16637	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006351	09-Apr-99	31616		34000		15826	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006358	26-May-99	31616		750		15831	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006359	26-May-99	31616		720		15830	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006360	26-May-99	31616		1100		11390	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006361	26-May-99	31616		1200		11390	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006362	26-May-99	31616		3600		11391	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006363	26-May-99	31616		2000		16637	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006365	26-May-99	31616		8900		15826	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006367	26-May-99	31616		460		16636	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006371	21-Jun-99	31616		16000		15831	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006372	21-Jun-99	31616		8000		15830	00-Jan-00	0.3			0					HG	HP	RT

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
tnrcweb	I006373	21-Jun-99	31616		11000		11390	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006374	21-Jun-99	31616		9000		11390	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006375	21-Jun-99	31616		11000		11391	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006376	21-Jun-99	31616		19000		16637	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006378	21-Jun-99	31616		15000		15826	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006385	05-Aug-99	31616		880		15831	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006386	05-Aug-99	31616		620		15830	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006387	05-Aug-99	31616		740		11390	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006388	05-Aug-99	31616		500		11390	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006389	05-Aug-99	31616		520		11391	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006390	05-Aug-99	31616		2200		16637	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006392	05-Aug-99	31616		710		15826	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006399	15-Sep-99	31616		1400		15831	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006400	15-Sep-99	31616		1000		15830	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006401	15-Sep-99	31616		1400		11390	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006402	15-Sep-99	31616		1500		11390	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006403	15-Sep-99	31616		1700		11391	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006404	15-Sep-99	31616		1400		16637	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I006406	15-Sep-99	31616		2500		15826	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I008632	01-Mar-99	31616		3400		11387	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008633	08-Mar-99	31616		3900		11387	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008634	15-Mar-99	31616		4500		11387	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008635	22-Mar-99	31616		2500		11387	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008636	14-Apr-99	31616		53000		11387	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008637	20-Apr-99	31616		21000		11387	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008638	26-Apr-99	31616		540		11387	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008639	29-Apr-99	31616		2500		11387	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008640	05-May-99	31616		1100		11387	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008641	08-Jun-99	31616		47000		11387	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008642	17-Jun-99	31616		3900		11387	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008643	23-Jun-99	31616		12000		11387	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008644	29-Jun-99	31616		6100		11387	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008645	15-Mar-99	31616		1600		16596	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008647	07-Apr-99	31616		3000		16596	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008649	21-Apr-99	31616		1000		16596	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008650	29-Apr-99	31616		65000		16596	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008651	05-May-99	31616		15000		16596	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008652	19-May-99	31616		7300		16596	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008653	26-May-99	31616	>	200000		16596	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008654	01-Jun-99	31616		3500		16596	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008655	09-Jun-99	31616	>	200000		16596	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008656	14-Jun-99	31616		3900		16596	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008657	21-Jun-99	31616		44000		16596	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008658	01-Jul-99	31616		5000		16596	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008659	15-Mar-99	31616		1000		16595	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008661	07-Apr-99	31616		44000		16595	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008663	21-Apr-99	31616		42000		16595	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008664	29-Apr-99	31616		5700		16595	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008665	05-May-99	31616	>	200000		16595	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008666	19-May-99	31616	>	200000		16595	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008667	26-May-99	31616	>	200000		16595	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008668	01-Jun-99	31616		67000		16595	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008669	09-Jun-99	31616	>	200000		16595	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008670	14-Jun-99	31616		26000		16595	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008671	21-Jun-99	31616	>	200000		16595	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008672	01-Jul-99	31616		12000		16595	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008673	15-Mar-99	31616		2600		16594	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008675	07-Apr-99	31616		31000		16594	00-Jan-00	0.3			0					HG	HH	RT

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
tnrcweb	I008677	21-Apr-99	31616		5700		16594	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008678	29-Apr-99	31616		11000		16594	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008679	05-May-99	31616		760		16594	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008680	19-May-99	31616		10000		16594	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008681	26-May-99	31616		33000		16594	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008682	01-Jun-99	31616		8100		16594	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008683	09-Jun-99	31616		52000		16594	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008684	14-Jun-99	31616		73000		16594	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008685	21-Jun-99	31616		47000		16594	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008686	01-Jul-99	31616		6400		16594	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008687	15-Mar-99	31616		1800		16593	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008689	07-Apr-99	31616		2000		16593	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008691	21-Apr-99	31616		14000		16593	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008692	29-Apr-99	31616		1300		16593	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008693	05-May-99	31616		850		16593	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008694	19-May-99	31616		1600		16593	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008695	26-May-99	31616		6400		16593	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008696	01-Jun-99	31616		9500		16593	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008697	09-Jun-99	31616		8000		16593	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008698	14-Jun-99	31616		31000		16593	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008699	21-Jun-99	31616		140000		16593	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008700	01-Jul-99	31616		510		16593	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008701	01-Mar-99	31616		1900		16648	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008702	08-Mar-99	31616		1700		16648	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008703	15-Mar-99	31616		77000		16648	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008704	22-Mar-99	31616		5600		16648	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008705	14-Apr-99	31616		86000		16648	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	7165	08-Feb-94	31616		870		11358	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	7166	08-Feb-94	31616		8600		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	7167	02-Feb-94	31616		210		11398	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	7466	04-May-94	31616		12000		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	7467	04-May-94	31616		550		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	7472	04-May-94	31616		1500		11358	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	7473	04-May-94	31616		22000		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	7474	25-May-94	31616		1000		11398	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	8576	10-Aug-94	31616		13000		11398	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	8589	18-Aug-94	31616	>	60000		11358	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	9445	13-Feb-95	31613		455		11398	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	9453	08-Feb-95	31613		10000		11345	00-Jan-00	0.3			0				LIM 70300 1 TRDE H	WC	FO	RT
tnrcweb	9455	08-Feb-95	31613		3850		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	9460	08-Feb-95	31613		21000		11358	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	9461	08-Feb-95	31613		21000		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	9754	08-Nov-94	31613		1200		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	9756	08-Nov-94	31613		60		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	9761	08-Nov-94	31613		110		11358	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	9762	08-Nov-94	31613		6000		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	12560	01-Aug-95	31613		3000		11398	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	12568	03-Aug-95	31613		17000		11345	00-Jan-00	0.3			0				LIM 01220 1 TRDE Totals did n	WC	FO	RT
tnrcweb	12569	03-Aug-95	31613		9000		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	12574	03-Aug-95	31613		12000		11358	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	12575	03-Aug-95	31613		21500		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	13917	06-Nov-95	31613		14000		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	13918	06-Nov-95	31613		470		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	13923	06-Nov-95	31613		4800		11358	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	13924	06-Nov-95	31613		60000		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	13925	16-Nov-95	31613		200		11398	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	14044	31-Jan-96	31613		45		11398	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	14052	29-Jan-96	31613		4000		11345	00-Jan-00	0.3			0					WC	FO	RT

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
tnrcweb	14053	29-Jan-96	31613		180		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	14058	29-Jan-96	31613		300		11358	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	14059	29-Jan-96	31613		10000		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	14950	06-May-96	31613		380		11398	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	14958	08-May-96	31613		1600		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	14959	08-May-96	31613		380		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	14964	08-May-96	31613		1800		11358	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	14965	08-May-96	31613		2100		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	16079	07-Aug-96	31613		2800		11398	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	16740	08-Oct-96	31613		30000		11345	00-Jan-00	0.3			0				LIM 00593 1 TRDE Above Cal.	WC	FO	RT
tnrcweb	16741	08-Oct-96	31613		24000		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	16748	08-Oct-96	31613		3000		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	17596	10-Feb-97	31613		7000		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	17597	10-Feb-97	31613		240		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	17601	10-Feb-97	31613		90		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	18258	08-May-97	31613		440		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	18262	08-May-97	31613		3500		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	19525	05-Aug-97	31613		100		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	19526	05-Aug-97	31613		5200		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	19530	05-Aug-97	31613		4600		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	22968	26-May-98	31613		1500		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	22969	26-May-98	31613		510		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	22970	26-May-98	31613		470		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	23083	18-May-98	31613		550		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	23085	18-May-98	31613	>	6000		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	23087	01-Jun-98	31613		1500		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	23088	01-Jun-98	31613		38000		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	23089	01-Jun-98	31613		310		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	23108	07-May-98	31613		800		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	23112	07-May-98	31613		700		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	23113	07-May-98	31613		900		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	23446	13-May-98	31613		160		11362	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	23447	13-May-98	31613		21500		11387	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	23448	13-May-98	31613		1000		11345	00-Jan-00	0.3			0					WC	FO	RT
tnrcweb	I005501	23-Jul-99	31616		3500		15826	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005512	28-Jan-99	31616		2500		11351	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005513	28-Jan-99	31616		2100		11351	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005516	28-Jan-99	31616		2700		15826	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005525	15-Feb-99	31616		2500		11351	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005526	15-Feb-99	31616		7400		11351	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005529	15-Feb-99	31616		4100		15826	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005538	23-Mar-99	31616		4200		11351	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005542	23-Mar-99	31616		3800		15826	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005551	26-Apr-99	31616		72		11351	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005552	26-Apr-99	31616		510		11351	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005555	26-Apr-99	31616		910		15826	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005564	20-May-99	31616		63		11351	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005565	20-May-99	31616		6400		11351	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005568	20-May-99	31616		510		15826	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005581	14-Jun-99	31616		1400		15826	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005592	21-Sep-99	31616		500		15826	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005606	25-Aug-99	31616		860		15826	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005710	12-Jul-99	31616		730		11364	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005712	12-Jul-99	31616		5000		11363	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005714	12-Jul-99	31616		2200		11362	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005715	12-Jul-99	31616		2300		11361	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005717	12-Jul-99	31616		2200		11360	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005718	12-Jul-99	31616		2900		11359	00-Jan-00	0.3			0					HG	HP	RT

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
tnrcweb	I005719	12-Jul-99	31616		3200		15846	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005720	12-Jul-99	31616		6000		11357	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005721	12-Jul-99	31616		3000		15845	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005722	12-Jul-99	31616		7300		11354	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005723	12-Jul-99	31616		9500		11353	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005731	12-Jul-99	31616		35000		11345	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005762	08-Feb-99	31616		270		11364	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005764	08-Feb-99	31616		220		11363	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005766	08-Feb-99	31616		500		11362	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005767	08-Feb-99	31616		810		11361	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005769	08-Feb-99	31616		690		11360	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005770	08-Feb-99	31616		500		11359	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005771	08-Feb-99	31616		930		15846	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005772	08-Feb-99	31616		1300		11357	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005773	08-Feb-99	31616		210		15845	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005774	08-Feb-99	31616		220		11354	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005775	08-Feb-99	31616		1100		11353	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005779	08-Feb-99	31616		1000		11351	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005783	08-Feb-99	31616		660		11345	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005788	08-Mar-99	31616		200		11364	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005790	08-Mar-99	31616		180		11363	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005792	08-Mar-99	31616		3000		11362	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005793	08-Mar-99	31616		810		11361	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005795	08-Mar-99	31616		690		11360	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005796	08-Mar-99	31616		390		11359	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005797	08-Mar-99	31616		930		15846	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005798	08-Mar-99	31616		170		11357	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005799	08-Mar-99	31616		220		15845	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005800	08-Mar-99	31616		1000		11354	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005801	08-Mar-99	31616		1100		11353	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005805	08-Mar-99	31616		1000		11351	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005809	08-Mar-99	31616		660		11345	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005813	12-Apr-99	31616		230		11364	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005815	12-Apr-99	31616		14000		11363	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005817	12-Apr-99	31616		38000		11362	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005818	12-Apr-99	31616		23000		11361	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005820	12-Apr-99	31616		6000		11360	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005821	12-Apr-99	31616		3000		11359	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005822	12-Apr-99	31616		1200		15846	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005823	12-Apr-99	31616		790		11357	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005824	12-Apr-99	31616		780		15845	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005825	12-Apr-99	31616		8100		11354	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005826	12-Apr-99	31616		1400		11353	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005830	12-Apr-99	31616		8400		11351	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005834	12-Apr-99	31616		1200		11345	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005838	17-May-99	31616		3300		11364	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005840	17-May-99	31616		1900		11363	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005842	17-May-99	31616		870		11362	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005843	17-May-99	31616		2100		11361	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005845	17-May-99	31616		700		11360	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005846	17-May-99	31616		2700		11359	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005847	17-May-99	31616		480		15846	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005848	17-May-99	31616		590		11357	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005849	17-May-99	31616		670		15845	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005850	17-May-99	31616		2800		11354	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005851	17-May-99	31616		1900		11353	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005855	17-May-99	31616		590		11351	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005859	17-May-99	31616		660		11345	00-Jan-00	0.3			0					HG	HP	RT

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
tnrcweb	I005864	07-Jun-99	31616		130		11364	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005866	07-Jun-99	31616		270		11363	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005868	07-Jun-99	31616		690		11362	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005869	07-Jun-99	31616		1200		11361	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I005871	07-Jun-99	31616		2100		11360	00-Jan-00	0.3			0					HG	HP	RT
tnrcweb	I008706	20-Apr-99	31616		1200		16648	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008707	26-Apr-99	31616		3200		16648	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008708	29-Apr-99	31616		2200		16648	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008709	11-May-99	31616		130000		16648	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008710	17-May-99	31616		560		16648	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008711	08-Jun-99	31616	>	200000		16648	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008712	17-Jun-99	31616		15000		16648	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008713	29-Jun-99	31616		1600		16648	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008714	08-Mar-99	31616		31000		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008715	15-Mar-99	31616		130000		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008716	18-Mar-99	31616		100000		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008718	07-Apr-99	31616		23000		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008719	07-Apr-99	31616		13000		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008721	21-Apr-99	31616		7600		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008722	21-Apr-99	31616		7400		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008723	29-Apr-99	31616		17000		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008724	29-Apr-99	31616		16000		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008725	05-May-99	31616		6500		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008726	05-May-99	31616		8700		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008727	19-May-99	31616		7400		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008728	19-May-99	31616		6400		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008729	26-May-99	31616		8400		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008730	26-May-99	31616		8100		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008731	01-Jun-99	31616		2200		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008732	01-Jun-99	31616		2800		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008733	09-Jun-99	31616	>	200000		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008735	14-Jun-99	31616		22000		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008736	14-Jun-99	31616		23000		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008737	21-Jun-99	31616		180000		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008739	01-Jul-99	31616		29000		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I008740	01-Jul-99	31616		27000		11148	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009083	01-Mar-99	31616		1100		11347	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009084	08-Mar-99	31616		1200		11347	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009085	15-Mar-99	31616		13000		11347	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009086	22-Mar-99	31616		2200		11347	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009087	29-Mar-99	31616		28000		11347	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009088	14-Apr-99	31616		13000		11347	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009089	20-Apr-99	31616		2000		11347	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009090	26-Apr-99	31616		1100		11347	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009091	29-Apr-99	31616		700		11347	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009092	05-May-99	31616		2000		11347	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009093	05-May-99	31616		2800		11347	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009094	17-May-99	31616		1400		11347	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009095	01-Jun-99	31616		2800		11347	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009096	17-Jun-99	31616		15000		11347	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009097	23-Jun-99	31616		6200		11347	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009098	29-Jun-99	31616		1700		11347	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009111	15-Mar-99	31616		680		16591	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009112	31-Mar-99	31616		450		16591	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009113	31-Mar-99	31616		360		16591	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009114	07-Apr-99	31616		420		16591	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009115	07-Apr-99	31616		480		16591	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009116	15-Apr-99	31616		900		16591	00-Jan-00	0.3			0					HG	HH	RT

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
tnrcweb	I009117	21-Apr-99	31616		3900		16591	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009119	29-Apr-99	31616		2600		16591	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009120	05-May-99	31616		400		16591	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009121	11-May-99	31616		8000		16591	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009122	11-May-99	31616		3800		16591	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009123	19-May-99	31616		400		16591	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009124	26-May-99	31616		150000		16591	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009125	14-Jun-99	31616		1700		16591	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009126	29-Jun-99	31616		1100		16591	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009127	03-Mar-99	31616		180		11188	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009128	10-Mar-99	31616		1500		11188	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009129	17-Mar-99	31616		310		11188	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009130	24-Mar-99	31616		7700		11188	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009131	31-Mar-99	31616		1900		11188	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009132	07-Apr-99	31616		21000		11188	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009133	15-Apr-99	31616		1300		11188	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009134	21-Apr-99	31616		920		11188	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009135	29-Apr-99	31616		1500		11188	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009136	29-Apr-99	31616		59000		11188	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009137	05-May-99	31616		2300		11188	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009138	11-May-99	31616		24000		11188	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009139	19-May-99	31616		1000		11188	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009140	26-May-99	31616		12000		11188	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009141	14-Jun-99	31616		1200		11188	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009142	14-Jun-99	31616		1100		11188	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009143	29-Jun-99	31616		4000		11188	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009144	03-Mar-99	31616		72		15847	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009145	10-Mar-99	31616		99		15847	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009146	17-Mar-99	31616		590		15847	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009147	24-Mar-99	31616		2900		15847	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009148	31-Mar-99	31616		2300		15847	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009149	07-Apr-99	31616		1100		15847	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009150	15-Apr-99	31616		1800		15847	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009151	21-Apr-99	31616		110		15847	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009152	29-Apr-99	31616		56000		15847	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009153	05-May-99	31616		1200		15847	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009154	05-May-99	31616		700		15847	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009155	11-May-99	31616		18000		15847	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009156	19-May-99	31616		1000		15847	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009157	19-May-99	31616		1400		15847	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009158	26-May-99	31616		4000		15847	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009159	26-May-99	31616		300		15847	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009160	14-Jun-99	31616		4000		15847	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009161	29-Jun-99	31616		1000		15847	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009162	29-Jun-99	31616		400		15847	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009163	03-Mar-99	31616		220		11163	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009164	10-Mar-99	31616		120		11163	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009165	17-Mar-99	31616		1100		11163	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009166	24-Mar-99	31616		180		11163	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009167	31-Mar-99	31616		960		11163	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009168	07-Apr-99	31616		860		11163	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009169	15-Apr-99	31616		200		11163	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009171	21-Apr-99	31616		140		11163	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009172	29-Apr-99	31616		45000		11163	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009173	05-May-99	31616		500		11163	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009174	11-May-99	31616		1600		11163	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009175	19-May-99	31616		800		11163	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009176	26-May-99	31616		200		11163	00-Jan-00	0.3			0					HG	HH	RT

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
tnrcweb	I009177	14-Jun-99	31616		3800		11163	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009195	03-Mar-99	31616		530		16592	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009196	10-Mar-99	31616		530		16592	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009197	17-Mar-99	31616		540		16592	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009198	24-Mar-99	31616		890		16592	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009199	31-Mar-99	31616		3000		16592	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009200	07-Apr-99	31616		580		16592	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009201	21-Apr-99	31616		1100		16592	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009202	29-Apr-99	31616		4900		16592	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009203	05-May-99	31616		36000		16592	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009204	11-May-99	31616		58000		16592	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009205	19-May-99	31616		3200		16592	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009206	26-May-99	31616		3700		16592	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009207	14-Jun-99	31616		2800		16592	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009208	29-Jun-99	31616		1000		16592	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009209	03-Mar-99	31616		850		16597	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009210	10-Mar-99	31616		3200		16597	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009211	17-Mar-99	31616		5400		16597	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009212	24-Mar-99	31616		1600		16597	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009213	31-Mar-99	31616		30000		16597	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009214	07-Apr-99	31616		2200		16597	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009215	15-Apr-99	31616		290000		16597	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009216	21-Apr-99	31616		56000		16597	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009217	29-Apr-99	31616		90000		16597	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009218	05-May-99	31616		3800		16597	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009219	11-May-99	31616		140000		16597	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009220	19-May-99	31616		41000		16597	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009221	26-May-99	31616		3400		16597	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009222	14-Jun-99	31616		4200		16597	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009223	29-Jun-99	31616		400		16597	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009224	01-Mar-99	31616		4300		11351	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009225	08-Mar-99	31616		18000		11351	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009226	15-Mar-99	31616		9000		11351	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009227	22-Mar-99	31616		1400		11351	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009228	29-Mar-99	31616		36000		11351	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009229	14-Apr-99	31616		14000		11351	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009230	20-Apr-99	31616		17000		11351	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009231	26-Apr-99	31616		3300		11351	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009232	29-Apr-99	31616		5400		11351	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009233	05-May-99	31616		1200		11351	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009234	17-May-99	31616		510		11351	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009235	01-Jun-99	31616		2900		11351	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009241	03-Mar-99	31616		220		11356	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009242	10-Mar-99	31616		200		11356	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009243	29-Mar-99	31616		11000		11356	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009244	14-Apr-99	31616		30000		11356	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009245	20-Apr-99	31616		980		11356	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009246	26-Apr-99	31616		290		11356	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009248	29-Apr-99	31616		1400		11356	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009249	05-May-99	31616		680		11356	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009250	11-May-99	31616		33000		11356	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009251	11-May-99	31616		26000		11356	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009252	17-May-99	31616		1700		11356	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009253	01-Jun-99	31616		4200		11356	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009254	08-Jun-99	31616		6000		11356	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009255	14-Jun-99	31616		5900		11356	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009256	17-Jun-99	31616		3600		11356	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009257	23-Jun-99	31616		4700		11356	00-Jan-00	0.3			0					HG	HH	RT

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
tnrcweb	I009258	29-Jun-99	31616		690		11356	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009259	03-Mar-99	31616		540		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009260	10-Mar-99	31616		210		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009261	17-Mar-99	31616		1300		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009262	24-Mar-99	31616		340		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009263	29-Mar-99	31616		6200		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009264	29-Mar-99	31616		7400		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009265	14-Apr-99	31616		4200		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009266	14-Apr-99	31616		2300		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009267	20-Apr-99	31616		700		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009268	20-Apr-99	31616		680		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009269	26-Apr-99	31616		700		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009270	29-Apr-99	31616		1700		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009271	29-Apr-99	31616		1500		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009272	05-May-99	31616		760		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009273	11-May-99	31616		40000		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009274	17-May-99	31616		2000		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009275	01-Jun-99	31616		15000		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009276	08-Jun-99	31616		10000		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009277	14-Jun-99	31616		15000		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009278	17-Jun-99	31616		3200		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009279	23-Jun-99	31616		33000		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009280	29-Jun-99	31616		320		11360	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009281	03-Mar-99	31616		170		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009282	03-Mar-99	31616		140		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009283	10-Mar-99	31616		140		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009284	17-Mar-99	31616		1300		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009285	24-Mar-99	31616		200		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009286	29-Mar-99	31616		850		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009287	14-Apr-99	31616		3400		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009288	20-Apr-99	31616		18		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009289	26-Apr-99	31616		110		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009290	29-Apr-99	31616		220		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009291	05-May-99	31616		670		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009292	11-May-99	31616		4900		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009293	17-May-99	31616		2300		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009294	17-May-99	31616		3100		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009295	01-Jun-99	31616		2700		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009296	01-Jun-99	31616		1400		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009297	08-Jun-99	31616		480		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009298	08-Jun-99	31616		1100		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009299	14-Jun-99	31616		3000		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009300	14-Jun-99	31616		2900		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009301	17-Jun-99	31616		2500		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009302	17-Jun-99	31616		1700		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009303	23-Jun-99	31616		1300		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009304	23-Jun-99	31616		3000		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009305	29-Jun-99	31616		81		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	I009306	29-Jun-99	31616		90		11364	00-Jan-00	0.3			0					HG	HH	RT
tnrcweb	R161838	18-Aug-94	31616	>	60000		11362	00-Jan-00	0.3			0				WATER CHOCOLATE BROWN.	WC	FO	RT
tnrcweb	R161839	18-Aug-94	31616	>	60000		11345	00-Jan-00	0.3			0				WATER CHOCOLATE BROWN.	WC	FO	RT
tnrcweb	R161840	18-Aug-94	31616	>	60000		11387	00-Jan-00	0.3			0				WATER CHOCOLATE BROWN.	WC	FO	RT
tnrcweb	R163665	24-May-95	31616		1100		11345	00-Jan-00	0.3			0				WATER GREEN. MOSTLY CLO	WC	FO	RT
tnrcweb	R163672	25-May-95	31616		5000		11398	00-Jan-00	0.3			0				WATER CLEAR. HEAVY TRAF	WC	FO	RT
tnrcweb	R163678	24-May-95	31616		450		11362	00-Jan-00	0.3			0				WATER TURBID BROWN. LOT	WC	FO	RT
tnrcweb	R163691	24-May-95	31616		6000		11358	00-Jan-00	0.3			0				WATER GREENISH-BROWN. M	WC	FO	RT
tnrcweb	R163692	24-May-95	31616		750		11387	00-Jan-00	0.3			0				WATER GREEN. MODERATE T	WC	FO	RT
tnrcweb	U059775	05-May-93	31625		6700		11351	00-Jan-00	0.3			0					GS	GS	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
tnrccweb	U059776	05-May-93	31625		8700		11351	00-Jan-00	0.3			0					GS	GS	
tnrccweb	U059777	05-May-93	31625		9300		11351	00-Jan-00	0.3			0					GS	GS	
tnrccweb	U059778	06-May-93	31625		23000		11351	00-Jan-00	0.3			0					GS	GS	
tnrccweb	U059779	06-May-93	31625		20000		11351	00-Jan-00	0.3			0					GS	GS	
tnrccweb	U059780	06-May-93	31625		9300		11351	00-Jan-00	0.3			0					GS	GS	
tnrccweb	U059781	23-May-93	31625		2900		11351	00-Jan-00	0.3			0					GS	GS	
tnrccweb	U059782	23-May-93	31625		3300		11351	00-Jan-00	0.3			0					GS	GS	
tnrccweb	U059783	23-May-93	31625		10000		11351	00-Jan-00	0.3			0					GS	GS	
tnrccweb	U059784	24-May-93	31625		25000		11351	00-Jan-00	0.3			0					GS	GS	
tnrccweb	U059785	24-May-93	31625		34000		11351	00-Jan-00	0.3			0					GS	GS	
tnrccweb	U059786	24-May-93	31625		12000		11351	00-Jan-00	0.3			0					GS	GS	
tnrccweb	U059787	19-Jun-93	31625		7000		11351	00-Jan-00	0.3			0					GS	GS	
tnrccweb	U059788	20-Jun-93	31625		16000		11351	00-Jan-00	0.3			0					GS	GS	
tnrccweb	U059789	20-Jun-93	31625		29000		11351	00-Jan-00	0.3			0					GS	GS	
tnrccweb	U059790	21-Jun-93	31625		1000		11351	00-Jan-00	0.3			0					GS	GS	
tnrccweb	U059791	21-Jun-93	31625		8000		11351	00-Jan-00	0.3			0					GS	GS	
tnrccweb	U059792	21-Jun-93	31625		11000		11351	00-Jan-00	0.3			0					GS	GS	
tnrccweb	U059793	08-Feb-93	31625		2700		11387	00-Jan-00	0.3			0					GS	GS	
tnrccweb	U059794	02-Jun-93	31625		3700		11387	00-Jan-00	0.3			0					GS	GS	
tnrccweb	U059795	23-Aug-93	31625		4100		11387	00-Jan-00	0.3			0					GS	GS	
bayouwq	WOL8801	07-Jul-88	31616		58000		15824	00-Jan-00									pothor1	HP	9901
bayouwq	WOL8802	01-Aug-88	31616		13600		15824	00-Jan-00									pothor1	HP	9925
bayouwq	WOL8803	01-Sep-88	31616		48000		15824	00-Jan-00									pothor1	HP	9950
bayouwq	WOL8804	10-Oct-88	31616		100000		15824	00-Jan-00									pothor1	HP	9974
bayouwq	WOC9011	11-Dec-90	31616		18		15830	00-Jan-00									pothor1	HP	7473
bayouwq	WOB9011	11-Dec-90	31616		99		15831	00-Jan-00									pothor1	HP	7471
bayouwq	WOL9101	14-Jan-91	31616		1700		15824	00-Jan-00									pothor1	HP	1453
bayouwq	WOM9101	22-Jan-91	31616		38000		11385	00-Jan-00									pothor1	HP	6969
bayouwq	WOE9101	22-Jan-91	31616		9		11390	00-Jan-00									pothor1	HP	6959
bayouwq	WOF9101	22-Jan-91	31616		9		11391	00-Jan-00									pothor1	HP	6961
bayouwq	WOL9102	22-Jan-91	31616		3100		15824	00-Jan-00									pothor1	HP	6973
bayouwq	WOK9101	22-Jan-91	31616		17000		15825	00-Jan-00									pothor1	HP	6971
bayouwq	WOJ9101	22-Jan-91	31616		130		15826	00-Jan-00									pothor1	HP	6967
bayouwq	WOA9101	22-Jan-91	31616		9		15827	00-Jan-00									pothor1	HP	6965
bayouwq	WOG9101	22-Jan-91	31616		27		15828	00-Jan-00									pothor1	HP	6963
bayouwq	WOD9101	22-Jan-91	31616		27		15829	00-Jan-00									pothor1	HP	6957
bayouwq	WOC9101	22-Jan-91	31616		9		15830	00-Jan-00									pothor1	HP	6955
bayouwq	WOB9101	22-Jan-91	31616		9		15831	00-Jan-00									pothor1	HP	6953
bayouwq	WOL9103	18-Feb-91	31616		6600		15824	00-Jan-00									pbayou	HP	658
bayouwq	WOM9102	20-Feb-91	31616		39000		11385	00-Jan-00									pbayou	HP	1000
bayouwq	WOE9102	20-Feb-91	31616		45		11390	00-Jan-00									pbayou	HP	990
bayouwq	WOF9102	20-Feb-91	31616		72		11391	00-Jan-00									pbayou	HP	992
bayouwq	WOL9104	20-Feb-91	31616		15000		15824	00-Jan-00									pbayou	HP	1004
bayouwq	WOK9102	20-Feb-91	31616		12000		15825	00-Jan-00									pbayou	HP	1002
bayouwq	WOJ9102	20-Feb-91	31616		540		15826	00-Jan-00									pbayou	HP	998
bayouwq	WOA9102	20-Feb-91	31616		310		15827	00-Jan-00									pbayou	HP	996
bayouwq	WOG9102	20-Feb-91	31616		110		15828	00-Jan-00									pbayou	HP	994
bayouwq	WOD9102	20-Feb-91	31616		18		15829	00-Jan-00									pbayou	HP	988
bayouwq	WOC9102	20-Feb-91	31616		140		15830	00-Jan-00									pbayou	HP	986
bayouwq	WOB9102	20-Feb-91	31616		4000		15831	00-Jan-00									pbayou	HP	984
bayouwq	WOL9105	25-Feb-91	31616		6100		15824	00-Jan-00									pbayou	HP	731
bayouwq	WOL9106	04-Mar-91	31616		6100		15824	00-Jan-00									pbayou	HP	1164
bayouwq	WOM9103	05-Mar-91	31616		5200		11385	00-Jan-00									pbayou	HP	1579
bayouwq	WOE9103	05-Mar-91	31616		45		11390	00-Jan-00									pbayou	HP	1569
bayouwq	WOF9103	05-Mar-91	31616		63		11391	00-Jan-00									pbayou	HP	1571
bayouwq	WOL9107	05-Mar-91	31616		7100		15824	00-Jan-00									pbayou	HP	1583
bayouwq	WOJ9103	05-Mar-91	31616		240		15826	00-Jan-00									pbayou	HP	1577
bayouwq	WOA9103	05-Mar-91	31616		99		15827	00-Jan-00									pbayou	HP	1575

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	WOG9103	05-Mar-91	31616		180		15828	00-Jan-00									pbayou	HP	1573
bayouwq	WOD9103	05-Mar-91	31616		9		15829	00-Jan-00									pbayou	HP	1567
bayouwq	WOC9103	05-Mar-91	31616		9		15830	00-Jan-00									pbayou	HP	1565
bayouwq	WOB9103	05-Mar-91	31616		640		15831	00-Jan-00									pbayou	HP	1563
bayouwq	WOL9108	20-Mar-91	31616		23000		15824	00-Jan-00									pbayou	HP	1237
bayouwq	WOL9109	25-Mar-91	31616		5800		15824	00-Jan-00									pbayou	HP	1310
bayouwq	WOL9110	02-Apr-91	31616		96000		15824	00-Jan-00									pbayou	HP	1743
bayouwq	WOL9111	09-Apr-91	31616		22000		15824	00-Jan-00									pbayou	HP	1816
bayouwq	WOM9104	10-Apr-91	31616		3900		11385	00-Jan-00									pbayou	HP	2158
bayouwq	WOE9104	10-Apr-91	31616		230		11390	00-Jan-00									pbayou	HP	2148
bayouwq	WOF9104	10-Apr-91	31616		180		11391	00-Jan-00									pbayou	HP	2150
bayouwq	WOL9112	10-Apr-91	31616		40000		15824	00-Jan-00									pbayou	HP	2162
bayouwq	WOJ9104	10-Apr-91	31616		380		15826	00-Jan-00									pbayou	HP	2156
bayouwq	WOA9104	10-Apr-91	31616		110		15827	00-Jan-00									pbayou	HP	2154
bayouwq	WOG9104	10-Apr-91	31616		120		15828	00-Jan-00									pbayou	HP	2152
bayouwq	WOD9104	10-Apr-91	31616		9		15829	00-Jan-00									pbayou	HP	2146
bayouwq	WOC9104	10-Apr-91	31616		140		15830	00-Jan-00									pbayou	HP	2144
bayouwq	WOB9104	10-Apr-91	31616		5500		15831	00-Jan-00									pbayou	HP	2142
bayouwq	WOL9113	30-Apr-91	31616		20000		15824	00-Jan-00									pbayou	HP	1889
bayouwq	WOL9114	06-May-91	31616		6000		15824	00-Jan-00									pbayou	HP	3236
bayouwq	WOE9105	07-May-91	31616		370		11390	00-Jan-00									pbayou	HP	3641
bayouwq	WOF9105	07-May-91	31616		450		11391	00-Jan-00									pbayou	HP	3643
bayouwq	WOJ9105	07-May-91	31616		1100		15826	00-Jan-00									pbayou	HP	3649
bayouwq	WOA9105	07-May-91	31616		1100		15827	00-Jan-00									pbayou	HP	3647
bayouwq	WOG9105	07-May-91	31616		580		15828	00-Jan-00									pbayou	HP	3645
bayouwq	WOD9105	07-May-91	31616		27		15829	00-Jan-00									pbayou	HP	3639
bayouwq	WOC9105	07-May-91	31616		54		15830	00-Jan-00									pbayou	HP	3637
bayouwq	WOB9105	07-May-91	31616		320		15831	00-Jan-00									pbayou	HP	3635
bayouwq	WOL9115	13-Jun-91	31616		6100		15824	00-Jan-00									pbayou	HP	4791
bayouwq	WOL9116	17-Jun-91	31616		33000		15824	00-Jan-00									pbayou	HP	4864
bayouwq	WOM9105	18-Jun-91	31616		11000		11385	00-Jan-00									pbayou	HP	5133
bayouwq	WOE9106	18-Jun-91	31616		8500		11390	00-Jan-00									pbayou	HP	5123
bayouwq	WOF9106	18-Jun-91	31616		14000		11391	00-Jan-00									pbayou	HP	5125
bayouwq	WOJ9106	18-Jun-91	31616		1500		15826	00-Jan-00									pbayou	HP	5131
bayouwq	WOA9106	18-Jun-91	31616		10000		15827	00-Jan-00									pbayou	HP	5129
bayouwq	WOG9106	18-Jun-91	31616		5500		15828	00-Jan-00									pbayou	HP	5127
bayouwq	WOD9106	18-Jun-91	31616		460		15829	00-Jan-00									pbayou	HP	5121
bayouwq	WOC9106	18-Jun-91	31616		1700		15830	00-Jan-00									pbayou	HP	5119
bayouwq	WOB9106	18-Jun-91	31616		5500		15831	00-Jan-00									pbayou	HP	5117
bayouwq	WOL9117	01-Jul-91	31616		10000		15824	00-Jan-00									pbayou	HP	6464
bayouwq	WOM9106	02-Jul-91	31616		60000		11385	00-Jan-00									pbayou	HP	7143
bayouwq	WOE9107	02-Jul-91	31616		2400		11390	00-Jan-00									pbayou	HP	7133
bayouwq	WOF9107	02-Jul-91	31616		5100		11391	00-Jan-00									pbayou	HP	7135
bayouwq	WOL9118	02-Jul-91	31616		22000		15824	00-Jan-00									pbayou	HP	7147
bayouwq	WOK9103	02-Jul-91	31616		35000		15825	00-Jan-00									pbayou	HP	7145
bayouwq	WOJ9107	02-Jul-91	31616		11000		15826	00-Jan-00									pbayou	HP	7141
bayouwq	WOA9107	02-Jul-91	31616		11000		15827	00-Jan-00									pbayou	HP	7139
bayouwq	WOG9107	02-Jul-91	31616		9200		15828	00-Jan-00									pbayou	HP	7137
bayouwq	WOD9107	02-Jul-91	31616		980		15829	00-Jan-00									pbayou	HP	7131
bayouwq	WOC9107	02-Jul-91	31616		1000		15830	00-Jan-00									pbayou	HP	7129
bayouwq	WOB9107	02-Jul-91	31616		10000		15831	00-Jan-00									pbayou	HP	7127
bayouwq	WOL9119	09-Jul-91	31616		140000		15824	00-Jan-00									pbayou	HP	6539
bayouwq	WOL9120	16-Jul-91	31616		15000		15824	00-Jan-00									pbayou	HP	6614
bayouwq	WOL9121	23-Jul-91	31616		160000		15824	00-Jan-00									pbayou	HP	6688
bayouwq	WOL9122	29-Jul-91	31616		35000		15824	00-Jan-00									pbayou	HP	6766
bayouwq	WOL9123	05-Aug-91	31616		8700		15824	00-Jan-00									pbayou	HP	8385
bayouwq	WOE9108	06-Aug-91	31616		1500		11390	00-Jan-00									pbayou	HP	8870
bayouwq	WOF9108	06-Aug-91	31616		1300		11391	00-Jan-00									pbayou	HP	8872

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	WOL9124	06-Aug-91	31616		7500		15824	00-Jan-00									pbayou	HP	8884
bayouwq	WOK9104	06-Aug-91	31616		5900		15825	00-Jan-00									pbayou	HP	8882
bayouwq	WOJ9108	06-Aug-91	31616		950		15826	00-Jan-00									pbayou	HP	8878
bayouwq	WOA9108	06-Aug-91	31616		600		15827	00-Jan-00									pbayou	HP	8876
bayouwq	WOG9108	06-Aug-91	31616		860		15828	00-Jan-00									pbayou	HP	8874
bayouwq	WOD9108	06-Aug-91	31616		160		15829	00-Jan-00									pbayou	HP	8868
bayouwq	WOC9108	06-Aug-91	31616		99		15830	00-Jan-00									pbayou	HP	8866
bayouwq	WOB9108	06-Aug-91	31616		1500		15831	00-Jan-00									pbayou	HP	8864
bayouwq	WOL8805	03-Nov-88	31616		8378		15824	00-Jan-00									pothor1	HP	9998
bayouwq	WOL8806	12-Dec-88	31616		928		15824	00-Jan-00									pothor1	HP	10022
bayouwq	WOL8902	02-Feb-89	31616		8900		15824	00-Jan-00									pothor1	HP	10071
bayouwq	WOL8903	06-Mar-89	31616		3900		15824	00-Jan-00									pothor1	HP	10096
bayouwq	WOL8904	04-Apr-89	31616		7600		15824	00-Jan-00									pothor1	HP	10123
bayouwq	WOL8905	01-May-89	31616		17000		15824	00-Jan-00									pothor1	HP	10149
bayouwq	WOL8906	13-Jun-89	31616		3700		15824	00-Jan-00									pothor1	HP	10174
bayouwq	WOL8907	13-Jul-89	31616		6000		15824	00-Jan-00									pothor1	HP	10199
bayouwq	WOL8908	04-Dec-89	31616		12000		15824	00-Jan-00									pothor1	HP	10262
bayouwq	WOE8901	20-Dec-89	31616		63		11390	00-Jan-00									pothor1	HP	7530
bayouwq	WOF8901	20-Dec-89	31616		110		11391	00-Jan-00									pothor1	HP	7532
bayouwq	WOL8909	20-Dec-89	31616		640		15824	00-Jan-00									pothor1	HP	7542
bayouwq	WOK8901	20-Dec-89	31616		820		15825	00-Jan-00									pothor1	HP	7540
bayouwq	WOJ8901	20-Dec-89	31616		81		15826	00-Jan-00									pothor1	HP	7538
bayouwq	WOA8901	20-Dec-89	31616		300		15827	00-Jan-00									pothor1	HP	7536
bayouwq	WOG8901	20-Dec-89	31616		220		15828	00-Jan-00									pothor1	HP	7534
bayouwq	WOD8901	20-Dec-89	31616		9		15829	00-Jan-00									pothor1	HP	7528
bayouwq	WOC8901	20-Dec-89	31616		9		15830	00-Jan-00									pothor1	HP	7526
bayouwq	WOB8901	20-Dec-89	31616		9		15831	00-Jan-00									pothor1	HP	7524
bayouwq	WOL8910	21-Dec-89	31616		1600		15824	00-Jan-00									pothor1	HP	10329
bayouwq	WOL8911	28-Dec-89	31616		2000		15824	00-Jan-00									pothor1	HP	10398
bayouwq	WOL9001	05-Jan-90	31616		9		15824	00-Jan-00									pothor1	HP	10467
bayouwq	WOL9002	12-Jan-90	31616		9700		15824	00-Jan-00									pothor1	HP	10538
bayouwq	WOE9001	18-Jan-90	31616		1500		11390	00-Jan-00									pothor1	HP	6908
bayouwq	WOF9001	18-Jan-90	31616		1100		11391	00-Jan-00									pothor1	HP	6910
bayouwq	WOL9003	18-Jan-90	31616		24000		15824	00-Jan-00									pothor1	HP	6920
bayouwq	WOK9001	18-Jan-90	31616		26000		15825	00-Jan-00									pothor1	HP	6918
bayouwq	WOJ9001	18-Jan-90	31616		29000		15826	00-Jan-00									pothor1	HP	6916
bayouwq	WOA9001	18-Jan-90	31616		2200		15827	00-Jan-00									pothor1	HP	6914
bayouwq	WOG9001	18-Jan-90	31616		1300		15828	00-Jan-00									pothor1	HP	6912
bayouwq	WOD9001	18-Jan-90	31616		54		15829	00-Jan-00									pothor1	HP	6906
bayouwq	WOC9001	18-Jan-90	31616		36		15830	00-Jan-00									pothor1	HP	6904
bayouwq	WOB9001	18-Jan-90	31616		260		15831	00-Jan-00									pothor1	HP	6902
bayouwq	WOL9004	22-Jan-90	31616		13000		15824	00-Jan-00									pothor1	HP	10609
bayouwq	WOL9005	29-Jan-90	31616		17000		15824	00-Jan-00									pothor1	HP	10680
bayouwq	WOL9006	06-Feb-90	31616		18000		15824	00-Jan-00									pothor1	HP	10751
bayouwq	WOE9002	12-Feb-90	31616		27		11390	00-Jan-00									pothor1	HP	7012
bayouwq	WOF9002	12-Feb-90	31616		87000		11391	00-Jan-00									pothor1	HP	7014
bayouwq	WOL9007	12-Feb-90	31616		4500		15824	00-Jan-00									pothor1	HP	7024
bayouwq	WOK9002	12-Feb-90	31616		11000		15825	00-Jan-00									pothor1	HP	7022
bayouwq	WOJ9002	12-Feb-90	31616		640		15826	00-Jan-00									pothor1	HP	7020
bayouwq	WOA9002	12-Feb-90	31616		150		15827	00-Jan-00									pothor1	HP	7018
bayouwq	WOG9002	12-Feb-90	31616		3300		15828	00-Jan-00									pothor1	HP	7016
bayouwq	WOD9002	12-Feb-90	31616		9		15829	00-Jan-00									pothor1	HP	7010
bayouwq	WOC9002	12-Feb-90	31616		9		15830	00-Jan-00									pothor1	HP	7008
bayouwq	WOB9002	12-Feb-90	31616		27		15831	00-Jan-00									pothor1	HP	7006
bayouwq	WOL9008	15-Feb-90	31616		78000		15824	00-Jan-00									pothor1	HP	10822
bayouwq	WOL9009	23-Feb-90	31616		3600		15824	00-Jan-00									pothor1	HP	10893
bayouwq	WOL9010	28-Feb-90	31616		40000		15824	00-Jan-00									pothor1	HP	10964
bayouwq	WOL9011	08-Mar-90	31616		48000		15824	00-Jan-00									pothor1	HP	11035

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	WOE9003	19-Mar-90	31616		1000		11390	00-Jan-00									poth1	HP	7063
bayouwq	WOF9003	19-Mar-90	31616		480		11391	00-Jan-00									poth1	HP	7065
bayouwq	WOL9012	19-Mar-90	31616		340000		15824	00-Jan-00									poth1	HP	7075
bayouwq	WOJ9003	19-Mar-90	31616		850		15826	00-Jan-00									poth1	HP	7071
bayouwq	WOA9003	19-Mar-90	31616		620		15827	00-Jan-00									poth1	HP	7069
bayouwq	WOG9003	19-Mar-90	31616		800		15828	00-Jan-00									poth1	HP	7067
bayouwq	WOD9003	19-Mar-90	31616		4700		15829	00-Jan-00									poth1	HP	7061
bayouwq	WOC9003	19-Mar-90	31616		7700		15830	00-Jan-00									poth1	HP	7059
bayouwq	WOB9003	19-Mar-90	31616		19000		15831	00-Jan-00									poth1	HP	7057
bayouwq	WOL9013	20-Mar-90	31616		2000		15824	00-Jan-00									poth1	HP	11106
bayouwq	WOL9014	27-Mar-90	31616		200000		15824	00-Jan-00									poth1	HP	11177
bayouwq	WOL9015	12-Apr-90	31616		5300		15824	00-Jan-00									poth1	HP	11248
bayouwq	WOE9004	25-Apr-90	31616		1500		11390	00-Jan-00									poth1	HP	7114
bayouwq	WOF9004	25-Apr-90	31616		980		11391	00-Jan-00									poth1	HP	7116
bayouwq	WOL9016	25-Apr-90	31616		8000		15824	00-Jan-00									poth1	HP	7126
bayouwq	WOJ9004	25-Apr-90	31616		2600		15826	00-Jan-00									poth1	HP	7122
bayouwq	WOA9004	25-Apr-90	31616		2100		15827	00-Jan-00									poth1	HP	7120
bayouwq	WOG9004	25-Apr-90	31616		1800		15828	00-Jan-00									poth1	HP	7118
bayouwq	WOD9004	25-Apr-90	31616		18		15829	00-Jan-00									poth1	HP	7112
bayouwq	WOC9004	25-Apr-90	31616		36		15830	00-Jan-00									poth1	HP	7110
bayouwq	WOB9004	25-Apr-90	31616		45		15831	00-Jan-00									poth1	HP	7108
bayouwq	WOL9017	10-May-90	31616		16000		15824	00-Jan-00									poth1	HP	11390
bayouwq	WOE9005	15-May-90	31616		1000		11390	00-Jan-00									poth1	HP	7165
bayouwq	WOF9005	15-May-90	31616		1700		11391	00-Jan-00									poth1	HP	7167
bayouwq	WOL9018	15-May-90	31616		1200		15824	00-Jan-00									poth1	HP	7177
bayouwq	WOK9003	15-May-90	31616		2400		15825	00-Jan-00									poth1	HP	7175
bayouwq	WOJ9005	15-May-90	31616		820		15826	00-Jan-00									poth1	HP	7173
bayouwq	WOA9005	15-May-90	31616		1800		15827	00-Jan-00									poth1	HP	7171
bayouwq	WOG9005	15-May-90	31616		1100		15828	00-Jan-00									poth1	HP	7169
bayouwq	WOD9005	15-May-90	31616		150		15829	00-Jan-00									poth1	HP	7163
bayouwq	WOC9005	15-May-90	31616		130		15830	00-Jan-00									poth1	HP	7161
bayouwq	WOB9005	15-May-90	31616		140		15831	00-Jan-00									poth1	HP	7159
bayouwq	WOL9019	21-May-90	31616		6500		15824	00-Jan-00									poth1	HP	11461
bayouwq	WOL9020	30-May-90	31616		4600		15824	00-Jan-00									poth1	HP	11532
bayouwq	WOL9021	04-Jun-90	31616		62000		15824	00-Jan-00									poth1	HP	11603
bayouwq	WOL9023	20-Jun-90	31616		45000		15824	00-Jan-00									poth1	HP	11745
bayouwq	WOE9006	25-Jun-90	31616		2500		11390	00-Jan-00									poth1	HP	7216
bayouwq	WOF9006	25-Jun-90	31616		3000		11391	00-Jan-00									poth1	HP	7218
bayouwq	WOL9024	25-Jun-90	31616		9500		15824	00-Jan-00									poth1	HP	7228
bayouwq	WOJ9006	25-Jun-90	31616		200000		15826	00-Jan-00									poth1	HP	7224
bayouwq	WOG9006	25-Jun-90	31616		23000		15828	00-Jan-00									poth1	HP	7220
bayouwq	WOD9006	25-Jun-90	31616		1500		15829	00-Jan-00									poth1	HP	7214
bayouwq	WOC9006	25-Jun-90	31616		9		15830	00-Jan-00									poth1	HP	7212
bayouwq	WOB9006	25-Jun-90	31616		9		15831	00-Jan-00									poth1	HP	7210
bayouwq	WOL9025	26-Jun-90	31616		75000		15824	00-Jan-00									poth1	HP	11816
bayouwq	WOL9026	02-Jul-90	31616		100000		15824	00-Jan-00									poth1	HP	11887
bayouwq	WOL9028	17-Jul-90	31616		700000		15824	00-Jan-00									poth1	HP	12029
bayouwq	WOE9007	19-Jul-90	31616		3000		11390	00-Jan-00									poth1	HP	7267
bayouwq	WOF9007	19-Jul-90	31616		1500		11391	00-Jan-00									poth1	HP	7269
bayouwq	WOL9029	19-Jul-90	31616		76000		15824	00-Jan-00									poth1	HP	7279
bayouwq	WOJ9007	19-Jul-90	31616		3700		15826	00-Jan-00									poth1	HP	7275
bayouwq	WOA9007	19-Jul-90	31616		2800		15827	00-Jan-00									poth1	HP	7273
bayouwq	WOG9007	19-Jul-90	31616		3300		15828	00-Jan-00									poth1	HP	7271
bayouwq	WOD9007	19-Jul-90	31616		230		15829	00-Jan-00									poth1	HP	7265
bayouwq	WOC9007	19-Jul-90	31616		63		15830	00-Jan-00									poth1	HP	7263
bayouwq	WOB9007	19-Jul-90	31616		3500		15831	00-Jan-00									poth1	HP	7261
bayouwq	WOL9030	31-Jul-90	31616		78000		15824	00-Jan-00									poth1	HP	12171
bayouwq	WOM9001	07-Aug-90	31616		960		11385	00-Jan-00									poth1	HP	7328

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	WOE9008	07-Aug-90	31616		590		11390	00-Jan-00									pothe1	HP	7318
bayouwq	WOF9008	07-Aug-90	31616		740		11391	00-Jan-00									pothe1	HP	7320
bayouwq	WOK9005	07-Aug-90	31616		8100		15825	00-Jan-00									pothe1	HP	7330
bayouwq	WOJ9008	07-Aug-90	31616		1300		15826	00-Jan-00									pothe1	HP	7326
bayouwq	WOA9008	07-Aug-90	31616		1600		15827	00-Jan-00									pothe1	HP	7324
bayouwq	WOG9008	07-Aug-90	31616		1800		15828	00-Jan-00									pothe1	HP	7322
bayouwq	WOD9008	07-Aug-90	31616		18		15829	00-Jan-00									pothe1	HP	7316
bayouwq	WOC9008	07-Aug-90	31616		18		15830	00-Jan-00									pothe1	HP	7314
bayouwq	WOB9008	07-Aug-90	31616		1300		15831	00-Jan-00									pothe1	HP	7312
bayouwq	WOL9031	28-Aug-90	31616		1000000		15824	00-Jan-00									pothe1	HP	12463
bayouwq	WOL9032	04-Sep-90	31616		11000		15824	00-Jan-00									pothe1	HP	12536
bayouwq	WOM9002	11-Sep-90	31616		4600		11385	00-Jan-00									pothe1	HP	7381
bayouwq	WOE9009	11-Sep-90	31616		750		11390	00-Jan-00									pothe1	HP	7371
bayouwq	WOF9009	11-Sep-90	31616		1200		11391	00-Jan-00									pothe1	HP	7373
bayouwq	WOL9033	11-Sep-90	31616		19000		15824	00-Jan-00									pothe1	HP	7385
bayouwq	WOK9006	11-Sep-90	31616		16000		15825	00-Jan-00									pothe1	HP	7383
bayouwq	WOJ9009	11-Sep-90	31616		17000		15826	00-Jan-00									pothe1	HP	7379
bayouwq	WOA9009	11-Sep-90	31616		15000		15827	00-Jan-00									pothe1	HP	7377
bayouwq	WOG9009	11-Sep-90	31616		14000		15828	00-Jan-00									pothe1	HP	7375
bayouwq	WOD9009	11-Sep-90	31616		54		15829	00-Jan-00									pothe1	HP	7369
bayouwq	WOC9009	11-Sep-90	31616		45		15830	00-Jan-00									pothe1	HP	7367
bayouwq	WOB9009	11-Sep-90	31616		2800		15831	00-Jan-00									pothe1	HP	7365
bayouwq	WOL9034	25-Sep-90	31616		170000		15824	00-Jan-00									pothe1	HP	12609
bayouwq	WOL9035	02-Oct-90	31616		19000		15824	00-Jan-00									pothe1	HP	3597
bayouwq	WOL9036	08-Oct-90	31616		150000		15824	00-Jan-00									pothe1	HP	3671
bayouwq	WOM9003	10-Oct-90	31616		110000		11385	00-Jan-00									pothe1	HP	7434
bayouwq	WOE9010	10-Oct-90	31616		1300		11390	00-Jan-00									pothe1	HP	7424
bayouwq	WOF9010	10-Oct-90	31616		1000		11391	00-Jan-00									pothe1	HP	7426
bayouwq	WOL9037	10-Oct-90	31616		28000		15824	00-Jan-00									pothe1	HP	7438
bayouwq	WOJ9010	10-Oct-90	31616		63000		15826	00-Jan-00									pothe1	HP	7432
bayouwq	WOA9010	10-Oct-90	31616		2000		15827	00-Jan-00									pothe1	HP	7430
bayouwq	WOG9010	10-Oct-90	31616		660		15828	00-Jan-00									pothe1	HP	7428
bayouwq	WOD9010	10-Oct-90	31616		63		15829	00-Jan-00									pothe1	HP	7422
bayouwq	WOC9010	10-Oct-90	31616		140		15830	00-Jan-00									pothe1	HP	7420
bayouwq	WOB9010	10-Oct-90	31616		2200		15831	00-Jan-00									pothe1	HP	7418
bayouwq	WOL9039	23-Oct-90	31616		64000		15824	00-Jan-00									pothe1	HP	3818
bayouwq	WOM9004	11-Dec-90	31616		1900		11385	00-Jan-00									pothe1	HP	7487
bayouwq	WOE9011	11-Dec-90	31616		9		11390	00-Jan-00									pothe1	HP	7477
bayouwq	WOF9011	11-Dec-90	31616		160		11391	00-Jan-00									pothe1	HP	7479
bayouwq	WOL9040	11-Dec-90	31616		76000		15824	00-Jan-00									pothe1	HP	7491
bayouwq	WOJ9011	11-Dec-90	31616		64000		15826	00-Jan-00									pothe1	HP	7485
bayouwq	WOA9011	11-Dec-90	31616		50000		15827	00-Jan-00									pothe1	HP	7483
bayouwq	WOG9011	11-Dec-90	31616		180		15828	00-Jan-00									pothe1	HP	7481
bayouwq	WOD9011	11-Dec-90	31616		9		15829	00-Jan-00									pothe1	HP	7475
bayouwq	WOL9125	13-Aug-91	31616		180000		15824	00-Jan-00									pbayou	HP	8463
bayouwq	WOL9126	20-Aug-91	31616		67000		15824	00-Jan-00									pbayou	HP	8533
bayouwq	WOL9127	26-Aug-91	31616		14000		15824	00-Jan-00									pbayou	HP	8603
bayouwq	WOL9128	09-Sep-91	31616		3000		15824	00-Jan-00									pbayou	HP	10252
bayouwq	WOM9107	10-Sep-91	31616		39000		11385	00-Jan-00									pbayou	HP	10606
bayouwq	WOL9129	10-Sep-91	31616		12000		15824	00-Jan-00									pbayou	HP	10610
bayouwq	WOK9105	10-Sep-91	31616		12000		15825	00-Jan-00									pbayou	HP	10608
bayouwq	WOL9130	26-Sep-91	31616		6400		15824	00-Jan-00									pbayou	HP	10333
bayouwq	WOL9131	07-Oct-91	31616		30000		15824	00-Jan-00									pbayou	HP	11281
bayouwq	WOM9108	08-Oct-91	31616		2900		11385	00-Jan-00									pbayou	HP	11692
bayouwq	WOE9110	08-Oct-91	31616		45		11390	00-Jan-00									pbayou	HP	11682
bayouwq	WOF9110	08-Oct-91	31616		130		11391	00-Jan-00									pbayou	HP	11684
bayouwq	WOL9132	08-Oct-91	31616		40000		15824	00-Jan-00									pbayou	HP	11696
bayouwq	WOK9106	08-Oct-91	31616		9100		15825	00-Jan-00									pbayou	HP	11694

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	WOJ9110	08-Oct-91	31616		120		15826	00-Jan-00									pbayou	HP	11690
bayouwq	WOA9110	08-Oct-91	31616		200		15827	00-Jan-00									pbayou	HP	11688
bayouwq	WOG9110	08-Oct-91	31616		81		15828	00-Jan-00									pbayou	HP	11686
bayouwq	WOD9110	08-Oct-91	31616		9		15829	00-Jan-00									pbayou	HP	11680
bayouwq	WOC9110	08-Oct-91	31616		9		15830	00-Jan-00									pbayou	HP	11678
bayouwq	WOB9110	08-Oct-91	31616		200		15831	00-Jan-00									pbayou	HP	11676
bayouwq	WOL9135	04-Nov-91	31616		190		15824	00-Jan-00									pbayou	HP	12908
bayouwq	WOM9109	05-Nov-91	31616		26000		11385	00-Jan-00									pbayou	HP	13172
bayouwq	WOE9111	05-Nov-91	31616		9		11390	00-Jan-00									pbayou	HP	13162
bayouwq	WOF9111	05-Nov-91	31616		9		11391	00-Jan-00									pbayou	HP	13164
bayouwq	WOL9136	05-Nov-91	31616		9		15824	00-Jan-00									pbayou	HP	13176
bayouwq	WOK9107	05-Nov-91	31616		160		15825	00-Jan-00									pbayou	HP	13174
bayouwq	WOJ9111	05-Nov-91	31616		9		15826	00-Jan-00									pbayou	HP	13170
bayouwq	WOA9111	05-Nov-91	31616		9		15827	00-Jan-00									pbayou	HP	13168
bayouwq	WOG9111	05-Nov-91	31616		9		15828	00-Jan-00									pbayou	HP	13166
bayouwq	WOD9111	05-Nov-91	31616		9		15829	00-Jan-00									pbayou	HP	13160
bayouwq	WOC9111	05-Nov-91	31616		9		15830	00-Jan-00									pbayou	HP	13158
bayouwq	WOB9111	05-Nov-91	31616		3500		15831	00-Jan-00									pbayou	HP	13156
bayouwq	WOM9201	08-Apr-92	31616		350000		11385	00-Jan-00									pbayou	HP	2539
bayouwq	WOE9201	08-Apr-92	31616		5500		11390	00-Jan-00									pbayou	HP	2529
bayouwq	WOF9201	08-Apr-92	31616		5800		11391	00-Jan-00									pbayou	HP	2531
bayouwq	WOL9201	08-Apr-92	31616		330000		15824	00-Jan-00									pbayou	HP	2543
bayouwq	WOK9201	08-Apr-92	31616		210000		15825	00-Jan-00									pbayou	HP	2541
bayouwq	WOJ9201	08-Apr-92	31616		4400		15826	00-Jan-00									pbayou	HP	2537
bayouwq	WOA9201	08-Apr-92	31616		5400		15827	00-Jan-00									pbayou	HP	2535
bayouwq	WOG9201	08-Apr-92	31616		5700		15828	00-Jan-00									pbayou	HP	2533
bayouwq	WOD9201	08-Apr-92	31616		1200		15829	00-Jan-00									pbayou	HP	2527
bayouwq	WOC9201	08-Apr-92	31616		840		15830	00-Jan-00									pbayou	HP	2525
bayouwq	WOB9201	08-Apr-92	31616		1100		15831	00-Jan-00									pbayou	HP	2523
bayouwq	WOL9202	13-Apr-92	31616		4400		15824	00-Jan-00									pbayou	HP	2320
bayouwq	WOM9202	16-Apr-92	31616		51000		11385	00-Jan-00									pbayou	HP	2588
bayouwq	WOE9202	16-Apr-92	31616		300		11390	00-Jan-00									pbayou	HP	2578
bayouwq	WOF9202	16-Apr-92	31616		410		11391	00-Jan-00									pbayou	HP	2580
bayouwq	WOL9203	16-Apr-92	31616		3700		15824	00-Jan-00									pbayou	HP	2592
bayouwq	WOK9202	16-Apr-92	31616		1200		15825	00-Jan-00									pbayou	HP	2590
bayouwq	WOJ9202	16-Apr-92	31616		200		15826	00-Jan-00									pbayou	HP	2586
bayouwq	WOA9202	16-Apr-92	31616		430		15827	00-Jan-00									pbayou	HP	2584
bayouwq	WOG9202	16-Apr-92	31616		430		15828	00-Jan-00									pbayou	HP	2582
bayouwq	WOD9202	16-Apr-92	31616		140		15829	00-Jan-00									pbayou	HP	2576
bayouwq	WOC9202	16-Apr-92	31616		210		15830	00-Jan-00									pbayou	HP	2574
bayouwq	WOB9202	16-Apr-92	31616		290		15831	00-Jan-00									pbayou	HP	2572
bayouwq	WOM9203	28-Apr-92	31616		43000		11385	00-Jan-00									pbayou	HP	2639
bayouwq	WOE9203	28-Apr-92	31616		790		11390	00-Jan-00									pbayou	HP	2629
bayouwq	WOF9203	28-Apr-92	31616		850		11391	00-Jan-00									pbayou	HP	2631
bayouwq	WOL9204	28-Apr-92	31616		3600		15824	00-Jan-00									pbayou	HP	2643
bayouwq	WOK9203	28-Apr-92	31616		14000		15825	00-Jan-00									pbayou	HP	2641
bayouwq	WOJ9203	28-Apr-92	31616		310		15826	00-Jan-00									pbayou	HP	2637
bayouwq	WOA9203	28-Apr-92	31616		1000		15827	00-Jan-00									pbayou	HP	2635
bayouwq	WOG9203	28-Apr-92	31616		580		15828	00-Jan-00									pbayou	HP	2633
bayouwq	WOD9203	28-Apr-92	31616		45		15829	00-Jan-00									pbayou	HP	2627
bayouwq	WOC9203	28-Apr-92	31616		45		15830	00-Jan-00									pbayou	HP	2625
bayouwq	WOB9203	28-Apr-92	31616		20		15831	00-Jan-00									pbayou	HP	2623
bayouwq	WOL9205	04-May-92	31616		1100		15824	00-Jan-00									pbayou	HP	3821
bayouwq	WOM9204	07-May-92	31616		49000		11385	00-Jan-00									pbayou	HP	4046
bayouwq	WOE9204	07-May-92	31616		2800		11390	00-Jan-00									pbayou	HP	4036
bayouwq	WOF9204	07-May-92	31616		390		11391	00-Jan-00									pbayou	HP	4038
bayouwq	WOL9206	07-May-92	31616		8100		15824	00-Jan-00									pbayou	HP	4050
bayouwq	WOK9204	07-May-92	31616		7700		15825	00-Jan-00									pbayou	HP	4048

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	WOJ9204	07-May-92	31616		2800		15826	00-Jan-00									pbayou	HP	4044
bayouwq	WOG9204	07-May-92	31616		950		15828	00-Jan-00									pbayou	HP	4040
bayouwq	WOD9204	07-May-92	31616		180		15829	00-Jan-00									pbayou	HP	4034
bayouwq	WOC9204	07-May-92	31616		160		15830	00-Jan-00									pbayou	HP	4032
bayouwq	WOB9204	07-May-92	31616		230		15831	00-Jan-00									pbayou	HP	4030
bayouwq	WOM9205	14-May-92	31616		63000		11385	00-Jan-00									pbayou	HP	4100
bayouwq	WOE9205	14-May-92	31616		7700		11390	00-Jan-00									pbayou	HP	4090
bayouwq	WOF9205	14-May-92	31616		5900		11391	00-Jan-00									pbayou	HP	4092
bayouwq	WOL9207	14-May-92	31616		4400		15824	00-Jan-00									pbayou	HP	4104
bayouwq	WOK9205	14-May-92	31616		6000		15825	00-Jan-00									pbayou	HP	4102
bayouwq	WOJ9205	14-May-92	31616		1600		15826	00-Jan-00									pbayou	HP	4098
bayouwq	WOA9204	14-May-92	31616		4800		15827	00-Jan-00									pbayou	HP	4096
bayouwq	WOG9205	14-May-92	31616		7500		15828	00-Jan-00									pbayou	HP	4094
bayouwq	WOD9205	14-May-92	31616		150		15829	00-Jan-00									pbayou	HP	4088
bayouwq	WOC9205	14-May-92	31616		150		15830	00-Jan-00									pbayou	HP	4086
bayouwq	WOB9205	14-May-92	31616		390		15831	00-Jan-00									pbayou	HP	4084
bayouwq	WOM9206	21-May-92	31616		47000		11385	00-Jan-00									pbayou	HP	4151
bayouwq	WOE9206	21-May-92	31616		4600		11390	00-Jan-00									pbayou	HP	4141
bayouwq	WOL9208	21-May-92	31616		21000		15824	00-Jan-00									pbayou	HP	4155
bayouwq	WOK9206	21-May-92	31616		22000		15825	00-Jan-00									pbayou	HP	4153
bayouwq	WOJ9206	21-May-92	31616		11000		15826	00-Jan-00									pbayou	HP	4149
bayouwq	WOA9205	21-May-92	31616		11000		15827	00-Jan-00									pbayou	HP	4147
bayouwq	WOG9206	21-May-92	31616		9900		15828	00-Jan-00									pbayou	HP	4145
bayouwq	WOD9206	21-May-92	31616		1600		15829	00-Jan-00									pbayou	HP	4139
bayouwq	WOC9206	21-May-92	31616		6000		15830	00-Jan-00									pbayou	HP	4137
bayouwq	WOB9206	21-May-92	31616		1200		15831	00-Jan-00									pbayou	HP	4135
bayouwq	WOM9207	26-May-92	31616		27000		11385	00-Jan-00									pbayou	HP	4203
bayouwq	WOF9206	26-May-92	31616		6000		11391	00-Jan-00									pbayou	HP	4195
bayouwq	WOL9209	26-May-92	31616		6400		15824	00-Jan-00									pbayou	HP	4207
bayouwq	WOK9207	26-May-92	31616		24000		15825	00-Jan-00									pbayou	HP	4205
bayouwq	WOJ9207	26-May-92	31616		5600		15826	00-Jan-00									pbayou	HP	4201
bayouwq	WOA9206	26-May-92	31616		4700		15827	00-Jan-00									pbayou	HP	4199
bayouwq	WOG9207	26-May-92	31616		5600		15828	00-Jan-00									pbayou	HP	4197
bayouwq	WOD9207	26-May-92	31616		5400		15829	00-Jan-00									pbayou	HP	4191
bayouwq	WOC9207	26-May-92	31616		7800		15830	00-Jan-00									pbayou	HP	4189
bayouwq	WOB9207	26-May-92	31616		570		15831	00-Jan-00									pbayou	HP	4187
bayouwq	WOM9208	11-Jun-92	31616		20000		11385	00-Jan-00									pbayou	HP	5530
bayouwq	WOE9207	11-Jun-92	31616		3700		11390	00-Jan-00									pbayou	HP	5520
bayouwq	WOF9207	11-Jun-92	31616		9800		11391	00-Jan-00									pbayou	HP	5522
bayouwq	WOL9210	11-Jun-92	31616		47000		15824	00-Jan-00									pbayou	HP	5534
bayouwq	WOK9208	11-Jun-92	31616		21000		15825	00-Jan-00									pbayou	HP	5532
bayouwq	WOJ9208	11-Jun-92	31616		6600		15826	00-Jan-00									pbayou	HP	5528
bayouwq	WOA9207	11-Jun-92	31616		9400		15827	00-Jan-00									pbayou	HP	5526
bayouwq	WOG9208	11-Jun-92	31616		11000		15828	00-Jan-00									pbayou	HP	5524
bayouwq	WOD9208	11-Jun-92	31616		8000		15829	00-Jan-00									pbayou	HP	5518
bayouwq	WOC9208	11-Jun-92	31616		4500		15830	00-Jan-00									pbayou	HP	5516
bayouwq	WOB9208	11-Jun-92	31616		2600		15831	00-Jan-00									pbayou	HP	5514
bayouwq	WOM9209	18-Jun-92	31616		91000		11385	00-Jan-00									pbayou	HP	5580
bayouwq	WOF9208	18-Jun-92	31616		12000		11391	00-Jan-00									pbayou	HP	5572
bayouwq	WOL9211	18-Jun-92	31616		20000		15824	00-Jan-00									pbayou	HP	5584
bayouwq	WOK9209	18-Jun-92	31616		36000		15825	00-Jan-00									pbayou	HP	5582
bayouwq	WOJ9209	18-Jun-92	31616		790		15826	00-Jan-00									pbayou	HP	5578
bayouwq	WOA9208	18-Jun-92	31616		750		15827	00-Jan-00									pbayou	HP	5576
bayouwq	WOG9209	18-Jun-92	31616		470		15828	00-Jan-00									pbayou	HP	5574
bayouwq	WOD9209	18-Jun-92	31616		3000		15829	00-Jan-00									pbayou	HP	5568
bayouwq	WOC9209	18-Jun-92	31616		140		15830	00-Jan-00									pbayou	HP	5566
bayouwq	WOB9209	18-Jun-92	31616		3400		15831	00-Jan-00									pbayou	HP	5564
bayouwq	WOL9212	22-Jun-92	31616		14000		15824	00-Jan-00									pbayou	HP	5285

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	WOM9210	23-Jun-92	31616		77000		11385	00-Jan-00									pbayou	HP	5629
bayouwq	WOE9208	23-Jun-92	31616		33000		11390	00-Jan-00									pbayou	HP	5619
bayouwq	WOF9209	23-Jun-92	31616		11000		11391	00-Jan-00									pbayou	HP	5621
bayouwq	WOL9213	23-Jun-92	31616		57000		15824	00-Jan-00									pbayou	HP	5633
bayouwq	WOA9209	23-Jun-92	31616		8500		15827	00-Jan-00									pbayou	HP	5625
bayouwq	WOG9210	23-Jun-92	31616		4300		15828	00-Jan-00									pbayou	HP	5623
bayouwq	WOD9210	23-Jun-92	31616		7000		15829	00-Jan-00									pbayou	HP	5617
bayouwq	WOC9210	23-Jun-92	31616		7500		15830	00-Jan-00									pbayou	HP	5615
bayouwq	WOB9210	23-Jun-92	31616		49000		15831	00-Jan-00									pbayou	HP	5613
bayouwq	WOM9211	30-Jun-92	31616		150000		11385	00-Jan-00									pbayou	HP	5684
bayouwq	WOE9209	30-Jun-92	31616		4400		11390	00-Jan-00									pbayou	HP	5674
bayouwq	WOF9210	30-Jun-92	31616		2300		11391	00-Jan-00									pbayou	HP	5676
bayouwq	WOL9214	30-Jun-92	31616		123000		15824	00-Jan-00									pbayou	HP	5688
bayouwq	WOJ9210	30-Jun-92	31616		2800		15826	00-Jan-00									pbayou	HP	5682
bayouwq	WOA9210	30-Jun-92	31616		3800		15827	00-Jan-00									pbayou	HP	5680
bayouwq	WOG9211	30-Jun-92	31616		950		15828	00-Jan-00									pbayou	HP	5678
bayouwq	WOD9211	30-Jun-92	31616		410		15829	00-Jan-00									pbayou	HP	5672
bayouwq	WOC9211	30-Jun-92	31616		730		15830	00-Jan-00									pbayou	HP	5670
bayouwq	WOB9211	30-Jun-92	31616		890		15831	00-Jan-00									pbayou	HP	5668
bayouwq	WOL9215	06-Jul-92	31616		350000		15824	00-Jan-00									pbayou	HP	7297
bayouwq	WOM9212	07-Jul-92	31616		350000		11385	00-Jan-00									pbayou	HP	7547
bayouwq	WOE9210	07-Jul-92	31616		670		11390	00-Jan-00									pbayou	HP	7537
bayouwq	WOF9211	07-Jul-92	31616		830		11391	00-Jan-00									pbayou	HP	7539
bayouwq	WOL9216	07-Jul-92	31616		74000		15824	00-Jan-00									pbayou	HP	7551
bayouwq	WOJ9211	07-Jul-92	31616		970		15826	00-Jan-00									pbayou	HP	7545
bayouwq	WOA9211	07-Jul-92	31616		880		15827	00-Jan-00									pbayou	HP	7543
bayouwq	WOG9212	07-Jul-92	31616		990		15828	00-Jan-00									pbayou	HP	7541
bayouwq	WOD9212	07-Jul-92	31616		1700		15829	00-Jan-00									pbayou	HP	7535
bayouwq	WOC9212	07-Jul-92	31616		3400		15830	00-Jan-00									pbayou	HP	7533
bayouwq	WOB9212	07-Jul-92	31616		61000		15831	00-Jan-00									pbayou	HP	7531
bayouwq	WOM9213	16-Jul-92	31616		22000		11385	00-Jan-00									pbayou	HP	7597
bayouwq	WOF9212	16-Jul-92	31616		47000		11391	00-Jan-00									pbayou	HP	7589
bayouwq	WOL9217	16-Jul-92	31616		57000		15824	00-Jan-00									pbayou	HP	7601
bayouwq	WOJ9212	16-Jul-92	31616		44000		15826	00-Jan-00									pbayou	HP	7595
bayouwq	WOA9212	16-Jul-92	31616		42000		15827	00-Jan-00									pbayou	HP	7593
bayouwq	WOG9213	16-Jul-92	31616		50000		15828	00-Jan-00									pbayou	HP	7591
bayouwq	WOD9213	16-Jul-92	31616		48000		15829	00-Jan-00									pbayou	HP	7585
bayouwq	WOC9213	16-Jul-92	31616		36000		15830	00-Jan-00									pbayou	HP	7583
bayouwq	WOB9213	16-Jul-92	31616		47000		15831	00-Jan-00									pbayou	HP	7581
bayouwq	WOM9214	23-Jul-92	31616		230000		11385	00-Jan-00									pbayou	HP	7699
bayouwq	WOE9212	23-Jul-92	31616		21000		11390	00-Jan-00									pbayou	HP	7689
bayouwq	WOL9218	23-Jul-92	31616		35000		15824	00-Jan-00									pbayou	HP	7703
bayouwq	WOA9213	23-Jul-92	31616		13000		15827	00-Jan-00									pbayou	HP	7695
bayouwq	WOC9214	23-Jul-92	31616		25000		15830	00-Jan-00									pbayou	HP	7685
bayouwq	WOB9214	23-Jul-92	31616		15000		15831	00-Jan-00									pbayou	HP	7683
bayouwq	WOM9215	06-Aug-92	31616		10000		11385	00-Jan-00									pbayou	HP	9289
bayouwq	WOF9213	06-Aug-92	31616		12000		11391	00-Jan-00									pbayou	HP	9281
bayouwq	WOL9219	06-Aug-92	31616		38000		15824	00-Jan-00									pbayou	HP	9293
bayouwq	WOJ9213	06-Aug-92	31616		27000		15826	00-Jan-00									pbayou	HP	9287
bayouwq	WOA9214	06-Aug-92	31616		11000		15827	00-Jan-00									pbayou	HP	9285
bayouwq	WOG9214	06-Aug-92	31616		10000		15828	00-Jan-00									pbayou	HP	9283
bayouwq	WOD9214	06-Aug-92	31616		840		15829	00-Jan-00									pbayou	HP	9277
bayouwq	WOC9215	06-Aug-92	31616		710		15830	00-Jan-00									pbayou	HP	9275
bayouwq	WOB9215	06-Aug-92	31616		2000		15831	00-Jan-00									pbayou	HP	9273
bayouwq	WOM9216	13-Aug-92	31616		2000		11385	00-Jan-00									pbayou	HP	9342
bayouwq	WOE9213	13-Aug-92	31616		2400		11390	00-Jan-00									pbayou	HP	9332
bayouwq	WOF9214	13-Aug-92	31616		3100		11391	00-Jan-00									pbayou	HP	9334
bayouwq	WOL9220	13-Aug-92	31616		36000		15824	00-Jan-00									pbayou	HP	9346

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	WOJ9214	13-Aug-92	31616		3800		15826	00-Jan-00									pbayou	HP	9340
bayouwq	WOA9215	13-Aug-92	31616		6100		15827	00-Jan-00									pbayou	HP	9338
bayouwq	WOD9215	13-Aug-92	31616		780		15829	00-Jan-00									pbayou	HP	9330
bayouwq	WOC9216	13-Aug-92	31616		2100		15830	00-Jan-00									pbayou	HP	9328
bayouwq	WOB9216	13-Aug-92	31616		1000		15831	00-Jan-00									pbayou	HP	9326
bayouwq	WOL9221	17-Aug-92	31616		4200		15824	00-Jan-00									pbayou	HP	9032
bayouwq	WOM9217	18-Aug-92	31616		2400		11385	00-Jan-00									pbayou	HP	9395
bayouwq	WOE9214	18-Aug-92	31616		370		11390	00-Jan-00									pbayou	HP	9385
bayouwq	WOF9215	18-Aug-92	31616		230		11391	00-Jan-00									pbayou	HP	9387
bayouwq	WOL9222	18-Aug-92	31616		3500		15824	00-Jan-00									pbayou	HP	9399
bayouwq	WOK9210	18-Aug-92	31616		3200		15825	00-Jan-00									pbayou	HP	9397
bayouwq	WOJ9215	18-Aug-92	31616		1000		15826	00-Jan-00									pbayou	HP	9393
bayouwq	WOA9216	18-Aug-92	31616		1000		15827	00-Jan-00									pbayou	HP	9391
bayouwq	WOG9215	18-Aug-92	31616		1000		15828	00-Jan-00									pbayou	HP	9389
bayouwq	WOD9216	18-Aug-92	31616		170		15829	00-Jan-00									pbayou	HP	9383
bayouwq	WOC9217	18-Aug-92	31616		770		15830	00-Jan-00									pbayou	HP	9381
bayouwq	WOB9217	18-Aug-92	31616		420		15831	00-Jan-00									pbayou	HP	9379
bayouwq	WOM9218	27-Aug-92	31616		14000		11385	00-Jan-00									pbayou	HP	9450
bayouwq	WOE9215	27-Aug-92	31616		14000		11390	00-Jan-00									pbayou	HP	9440
bayouwq	WOF9216	27-Aug-92	31616		9600		11391	00-Jan-00									pbayou	HP	9442
bayouwq	WOL9223	27-Aug-92	31616		25000		15824	00-Jan-00									pbayou	HP	9454
bayouwq	WOJ9216	27-Aug-92	31616		72000		15826	00-Jan-00									pbayou	HP	9448
bayouwq	WOA9217	27-Aug-92	31616		20000		15827	00-Jan-00									pbayou	HP	9446
bayouwq	WOG9216	27-Aug-92	31616		5400		15828	00-Jan-00									pbayou	HP	9444
bayouwq	WOD9217	27-Aug-92	31616		23000		15829	00-Jan-00									pbayou	HP	9438
bayouwq	WOC9218	27-Aug-92	31616		250000		15830	00-Jan-00									pbayou	HP	9436
bayouwq	WOB9218	27-Aug-92	31616		2300		15831	00-Jan-00									pbayou	HP	9434
bayouwq	WOM9219	31-Aug-92	31616		9100		11385	00-Jan-00									pbayou	HP	9505
bayouwq	WOF9217	31-Aug-92	31616		5900		11391	00-Jan-00									pbayou	HP	9497
bayouwq	WOL9224	31-Aug-92	31616		4600		15824	00-Jan-00									pbayou	HP	9509
bayouwq	WOK9211	31-Aug-92	31616		21000		15825	00-Jan-00									pbayou	HP	9507
bayouwq	WOJ9217	31-Aug-92	31616		5100		15826	00-Jan-00									pbayou	HP	9503
bayouwq	WOA9218	31-Aug-92	31616		11000		15827	00-Jan-00									pbayou	HP	9501
bayouwq	WOG9217	31-Aug-92	31616		3700		15828	00-Jan-00									pbayou	HP	9499
bayouwq	WOD9218	31-Aug-92	31616		360		15829	00-Jan-00									pbayou	HP	9493
bayouwq	WOC9219	31-Aug-92	31616		550		15830	00-Jan-00									pbayou	HP	9491
bayouwq	WOB9219	31-Aug-92	31616		1100		15831	00-Jan-00									pbayou	HP	9489
bayouwq	WOM9220	10-Sep-92	31616		5200		11385	00-Jan-00									pbayou	HP	11026
bayouwq	WOE9216	10-Sep-92	31616		10000		11390	00-Jan-00									pbayou	HP	11016
bayouwq	WOF9218	10-Sep-92	31616		15000		11391	00-Jan-00									pbayou	HP	11018
bayouwq	WOL9225	10-Sep-92	31616		17000		15824	00-Jan-00									pbayou	HP	11030
bayouwq	WOK9212	10-Sep-92	31616		5500		15825	00-Jan-00									pbayou	HP	11028
bayouwq	WOJ9218	10-Sep-92	31616		4600		15826	00-Jan-00									pbayou	HP	11024
bayouwq	WOA9219	10-Sep-92	31616		4900		15827	00-Jan-00									pbayou	HP	11022
bayouwq	WOG9218	10-Sep-92	31616		9100		15828	00-Jan-00									pbayou	HP	11020
bayouwq	WOD9219	10-Sep-92	31616		3500		15829	00-Jan-00									pbayou	HP	11014
bayouwq	WOC9220	10-Sep-92	31616		15000		15830	00-Jan-00									pbayou	HP	11012
bayouwq	WOB9220	10-Sep-92	31616		2400		15831	00-Jan-00									pbayou	HP	11010
bayouwq	WOL9226	22-Sep-92	31616		23000		15824	00-Jan-00									pbayou	HP	10767
bayouwq	WOM9221	24-Sep-92	31616		5800		11385	00-Jan-00									pbayou	HP	11084
bayouwq	WOE9217	24-Sep-92	31616		1500		11390	00-Jan-00									pbayou	HP	11074
bayouwq	WOF9219	24-Sep-92	31616		2800		11391	00-Jan-00									pbayou	HP	11076
bayouwq	WOL9227	24-Sep-92	31616		16000		15824	00-Jan-00									pbayou	HP	11088
bayouwq	WOK9213	24-Sep-92	31616		17000		15825	00-Jan-00									pbayou	HP	11086
bayouwq	WOJ9219	24-Sep-92	31616		3700		15826	00-Jan-00									pbayou	HP	11082
bayouwq	WOA9220	24-Sep-92	31616		2300		15827	00-Jan-00									pbayou	HP	11080
bayouwq	WOG9219	24-Sep-92	31616		2400		15828	00-Jan-00									pbayou	HP	11078
bayouwq	WOD9220	24-Sep-92	31616		570		15829	00-Jan-00									pbayou	HP	11072

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	WOC9221	24-Sep-92	31616		1500		15830	00-Jan-00									pbayou	HP	11070
bayouwq	WOB9221	24-Sep-92	31616		530		15831	00-Jan-00									pbayou	HP	11068
bayouwq	WOM9222	01-Oct-92	31616		1000		11385	00-Jan-00									pbayou	HP	12099
bayouwq	WOE9218	01-Oct-92	31616		800		11390	00-Jan-00									pbayou	HP	12089
bayouwq	WOL9228	01-Oct-92	31616		140000		15824	00-Jan-00									pbayou	HP	12103
bayouwq	WOK9214	01-Oct-92	31616		6000		15825	00-Jan-00									pbayou	HP	12101
bayouwq	WOJ9220	01-Oct-92	31616		9800		15826	00-Jan-00									pbayou	HP	12097
bayouwq	WOA9221	01-Oct-92	31616		7300		15827	00-Jan-00									pbayou	HP	12095
bayouwq	WOG9220	01-Oct-92	31616		7200		15828	00-Jan-00									pbayou	HP	12093
bayouwq	WOD9221	01-Oct-92	31616		440		15829	00-Jan-00									pbayou	HP	12087
bayouwq	WOC9222	01-Oct-92	31616		340		15830	00-Jan-00									pbayou	HP	12085
bayouwq	WOB9222	01-Oct-92	31616		500		15831	00-Jan-00									pbayou	HP	12083
bayouwq	WOM9223	08-Oct-92	31616		4200		11385	00-Jan-00									pbayou	HP	12152
bayouwq	WOE9219	08-Oct-92	31616		4800		11390	00-Jan-00									pbayou	HP	12142
bayouwq	WOF9220	08-Oct-92	31616		5300		11391	00-Jan-00									pbayou	HP	12144
bayouwq	WOL9229	08-Oct-92	31616		4900		15824	00-Jan-00									pbayou	HP	12156
bayouwq	WOK9215	08-Oct-92	31616		3900		15825	00-Jan-00									pbayou	HP	12154
bayouwq	WOJ9221	08-Oct-92	31616		3100		15826	00-Jan-00									pbayou	HP	12150
bayouwq	WOA9222	08-Oct-92	31616		5500		15827	00-Jan-00									pbayou	HP	12148
bayouwq	WOD9222	08-Oct-92	31616		9400		15829	00-Jan-00									pbayou	HP	12140
bayouwq	WOC9223	08-Oct-92	31616		21000		15830	00-Jan-00									pbayou	HP	12138
bayouwq	WOB9223	08-Oct-92	31616		33000		15831	00-Jan-00									pbayou	HP	12136
bayouwq	WOL9230	12-Oct-92	31616		20000		15824	00-Jan-00									pbayou	HP	11848
bayouwq	WOM9224	13-Oct-92	31616		230		11385	00-Jan-00									pbayou	HP	12202
bayouwq	WOE9220	13-Oct-92	31616		170		11390	00-Jan-00									pbayou	HP	12192
bayouwq	WOF9221	13-Oct-92	31616		250		11391	00-Jan-00									pbayou	HP	12194
bayouwq	WOL9231	13-Oct-92	31616		11000		15824	00-Jan-00									pbayou	HP	12206
bayouwq	WOK9216	13-Oct-92	31616		4700		15825	00-Jan-00									pbayou	HP	12204
bayouwq	WOJ9222	13-Oct-92	31616		90		15826	00-Jan-00									pbayou	HP	12200
bayouwq	WOA9223	13-Oct-92	31616		54		15827	00-Jan-00									pbayou	HP	12198
bayouwq	WOG9222	13-Oct-92	31616		72		15828	00-Jan-00									pbayou	HP	12196
bayouwq	WOD9223	13-Oct-92	31616		27		15829	00-Jan-00									pbayou	HP	12190
bayouwq	WOC9224	13-Oct-92	31616		140		15830	00-Jan-00									pbayou	HP	12188
bayouwq	WOB9224	13-Oct-92	31616		140		15831	00-Jan-00									pbayou	HP	12186
bayouwq	WOM9225	20-Oct-92	31616		3400		11385	00-Jan-00									pbayou	HP	12251
bayouwq	WOE9221	20-Oct-92	31616		6300		11390	00-Jan-00									pbayou	HP	12241
bayouwq	WOF9222	20-Oct-92	31616		5900		11391	00-Jan-00									pbayou	HP	12243
bayouwq	WOL9232	20-Oct-92	31616		91000		15824	00-Jan-00									pbayou	HP	12255
bayouwq	WOK9217	20-Oct-92	31616		29000		15825	00-Jan-00									pbayou	HP	12253
bayouwq	WOJ9223	20-Oct-92	31616		8500		15826	00-Jan-00									pbayou	HP	12249
bayouwq	WOA9224	20-Oct-92	31616		7500		15827	00-Jan-00									pbayou	HP	12247
bayouwq	WOG9223	20-Oct-92	31616		8000		15828	00-Jan-00									pbayou	HP	12245
bayouwq	WOD9224	20-Oct-92	31616		220		15829	00-Jan-00									pbayou	HP	12239
bayouwq	WOC9225	20-Oct-92	31616		370		15830	00-Jan-00									pbayou	HP	12237
bayouwq	WOB9225	20-Oct-92	31616		520		15831	00-Jan-00									pbayou	HP	12235
bayouwq	WOM9226	27-Oct-92	31616		2600		11385	00-Jan-00									pbayou	HP	12301
bayouwq	WOE9222	27-Oct-92	31616		23000		11390	00-Jan-00									pbayou	HP	12291
bayouwq	WOF9223	27-Oct-92	31616		30000		11391	00-Jan-00									pbayou	HP	12293
bayouwq	WOL9233	27-Oct-92	31616		25000		15824	00-Jan-00									pbayou	HP	12305
bayouwq	WOK9218	27-Oct-92	31616		24000		15825	00-Jan-00									pbayou	HP	12303
bayouwq	WOJ9224	27-Oct-92	31616		56000		15826	00-Jan-00									pbayou	HP	12299
bayouwq	WOA9225	27-Oct-92	31616		66000		15827	00-Jan-00									pbayou	HP	12297
bayouwq	WOG9224	27-Oct-92	31616		37000		15828	00-Jan-00									pbayou	HP	12295
bayouwq	WOD9225	27-Oct-92	31616		3900		15829	00-Jan-00									pbayou	HP	12289
bayouwq	WOC9226	27-Oct-92	31616		4100		15830	00-Jan-00									pbayou	HP	12287
bayouwq	WOB9226	27-Oct-92	31616		1400		15831	00-Jan-00									pbayou	HP	12285
bayouwq	WOM9227	05-Nov-92	31616		3800		11385	00-Jan-00									pbayou	HP	13582
bayouwq	WOE9223	05-Nov-92	31616		890		11390	00-Jan-00									pbayou	HP	13572

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	WOF9224	05-Nov-92	31616		2800		11391	00-Jan-00									pbayou	HP	13574
bayouwq	WOL9234	05-Nov-92	31616		8800		15824	00-Jan-00									pbayou	HP	13586
bayouwq	WOK9219	05-Nov-92	31616		5600		15825	00-Jan-00									pbayou	HP	13584
bayouwq	WOJ9225	05-Nov-92	31616		2300		15826	00-Jan-00									pbayou	HP	13580
bayouwq	WOA9226	05-Nov-92	31616		2900		15827	00-Jan-00									pbayou	HP	13578
bayouwq	WOG9225	05-Nov-92	31616		2300		15828	00-Jan-00									pbayou	HP	13576
bayouwq	WOD9226	05-Nov-92	31616		1100		15829	00-Jan-00									pbayou	HP	13570
bayouwq	WOC9227	05-Nov-92	31616		590		15830	00-Jan-00									pbayou	HP	13568
bayouwq	WOB9227	05-Nov-92	31616		560		15831	00-Jan-00									pbayou	HP	13566
bayouwq	WOL9235	16-Nov-92	31616		15000		15824	00-Jan-00									pbayou	HP	13326
bayouwq	WOL9236	08-Dec-92	31616		24000		15824	00-Jan-00							BM		pbayou	HP	13619
bayouwq	WOM9301	12-Apr-93	31616		2300		11385	00-Jan-00									pbayou	HP	3078
bayouwq	WOK9301	12-Apr-93	31616		4100		15825	00-Jan-00									pbayou	HP	3080
bayouwq	WOJ9301	12-Apr-93	31616		2900		15826	00-Jan-00									pbayou	HP	3076
bayouwq	WOC9301	12-Apr-93	31616		990		15830	00-Jan-00									pbayou	HP	3070
bayouwq	WOB9301	12-Apr-93	31616		350		15831	00-Jan-00									pbayou	HP	3068
bayouwq	WOM9302	12-May-93	31616		2700		11385	00-Jan-00									pbayou	HP	4633
bayouwq	WOE9301	12-May-93	31616		2100		11390	00-Jan-00									pbayou	HP	4623
bayouwq	WOF9301	12-May-93	31616		1300		11391	00-Jan-00									pbayou	HP	4625
bayouwq	WOK9302	12-May-93	31616		3300		15825	00-Jan-00									pbayou	HP	4635
bayouwq	WOJ9302	12-May-93	31616		2000		15826	00-Jan-00									pbayou	HP	4631
bayouwq	WOD9301	12-May-93	31616		860		15829	00-Jan-00									pbayou	HP	4621
bayouwq	WOC9302	12-May-93	31616		820		15830	00-Jan-00									pbayou	HP	4619
bayouwq	WOB9302	12-May-93	31616		2200		15831	00-Jan-00									pbayou	HP	4617
bayouwq	WOM9303	28-May-93	31616		27000		11385	00-Jan-00							BM		pbayou	HP	4277
bayouwq	WOJ9303	28-May-93	31616		5700		15826	00-Jan-00							BM		pbayou	HP	4279
bayouwq	WOM9304	03-Jun-93	31616		16000		11385	00-Jan-00							BM		pbayou	HP	5759
bayouwq	WOA9301	03-Jun-93	31616		3000		15827	00-Jan-00							BM		pbayou	HP	5761
bayouwq	WOM9305	09-Jun-93	31616		11000		11385	00-Jan-00									pbayou	HP	6306
bayouwq	WOK9303	09-Jun-93	31616		30000		15825	00-Jan-00									pbayou	HP	6308
bayouwq	WOJ9304	09-Jun-93	31616		2100		15826	00-Jan-00									pbayou	HP	6304
bayouwq	WOA9302	09-Jun-93	31616		2000		15827	00-Jan-00									pbayou	HP	6300
bayouwq	WOD9302	09-Jun-93	31616		480		15829	00-Jan-00									pbayou	HP	6292
bayouwq	WOC9303	09-Jun-93	31616		520		15830	00-Jan-00									pbayou	HP	6290
bayouwq	WOB9303	09-Jun-93	31616		760		15831	00-Jan-00									pbayou	HP	6288
bayouwq	WOM9306	10-Jun-93	31616		260		11385	00-Jan-00							BM		pbayou	HP	5806
bayouwq	WOA9303	10-Jun-93	31616		4200		15827	00-Jan-00							BM		pbayou	HP	5808
bayouwq	WOM9307	16-Jun-93	31616		21000		11385	00-Jan-00							BM		pbayou	HP	5853
bayouwq	WOA9304	16-Jun-93	31616		4500		15827	00-Jan-00							BM		pbayou	HP	5855
bayouwq	WOM9308	29-Jun-93	31616		7500		11385	00-Jan-00							BM		pbayou	HP	5901
bayouwq	WOA9305	29-Jun-93	31616		16000		15827	00-Jan-00							BM		pbayou	HP	5903
bayouwq	WOM9309	07-Jul-93	31616		4000		11385	00-Jan-00							BM		pbayou	HP	7773
bayouwq	WOA9306	07-Jul-93	31616		42000		15827	00-Jan-00							BM		pbayou	HP	7775
bayouwq	WOM9310	14-Jul-93	31616		2000		11385	00-Jan-00							BM		pbayou	HP	7818
bayouwq	WOA9307	14-Jul-93	31616		11000		15827	00-Jan-00							BM		pbayou	HP	7820
bayouwq	WOG9301	14-Jul-93	31616		19000		15828	00-Jan-00							BM		pbayou	HP	7832
bayouwq	WOM9311	26-Jul-93	31616		2700		11385	00-Jan-00									pbayou	HP	8233
bayouwq	WOE9302	26-Jul-93	31616		32000		11390	00-Jan-00									pbayou	HP	8221
bayouwq	WOJ9305	26-Jul-93	31616		7300		15826	00-Jan-00									pbayou	HP	8231
bayouwq	WOA9308	26-Jul-93	31616		9700		15827	00-Jan-00									pbayou	HP	8227
bayouwq	WOC9304	26-Jul-93	31616		68000		15830	00-Jan-00									pbayou	HP	8217
bayouwq	WOB9304	26-Jul-93	31616		1900		15831	00-Jan-00									pbayou	HP	8215
bayouwq	WOM9312	28-Jul-93	31616		3800		11385	00-Jan-00							BM		pbayou	HP	7866
bayouwq	WOA9309	28-Jul-93	31616		1400		15827	00-Jan-00							BM		pbayou	HP	7868
bayouwq	WOM9313	04-Aug-93	31616		2700		11385	00-Jan-00							BM		pbayou	HP	9585
bayouwq	WOA9310	04-Aug-93	31616		65000		15827	00-Jan-00							BM		pbayou	HP	9587
bayouwq	WOG9302	04-Aug-93	31616		18000		15828	00-Jan-00							BM		pbayou	HP	9599
bayouwq	WOM9314	11-Aug-93	31616		820		11385	00-Jan-00							BM		pbayou	HP	9633

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	WOA9311	11-Aug-93	31616		7200		15827	00-Jan-00								BM	pbayou	HP	9635
bayouwq	WOM9315	16-Aug-93	31616		3800		11385	00-Jan-00									pbayou	HP	10089
bayouwq	WOE9303	16-Aug-93	31616		9700		11390	00-Jan-00									pbayou	HP	10079
bayouwq	WOK9304	16-Aug-93	31616		68000		15825	00-Jan-00									pbayou	HP	10091
bayouwq	WOJ9306	16-Aug-93	31616		2100		15826	00-Jan-00									pbayou	HP	10087
bayouwq	WOA9312	16-Aug-93	31616		2100		15827	00-Jan-00									pbayou	HP	10085
bayouwq	WOC9305	16-Aug-93	31616		5700		15830	00-Jan-00									pbayou	HP	10075
bayouwq	WOB9305	16-Aug-93	31616		8300		15831	00-Jan-00									pbayou	HP	10073
bayouwq	WOM9316	18-Aug-93	31616		2100		11385	00-Jan-00								BM	pbayou	HP	9679
bayouwq	WOA9313	18-Aug-93	31616		9400		15827	00-Jan-00								BM	pbayou	HP	9681
bayouwq	WOM9317	25-Aug-93	31616		7200		11385	00-Jan-00								BM	pbayou	HP	9725
bayouwq	WOA9314	25-Aug-93	31616		7800		15827	00-Jan-00								BM	pbayou	HP	9727
bayouwq	WOF9302	04-Oct-93	31616		2300		11391	00-Jan-00									pbayou	HP	12732
bayouwq	WOK9305	04-Oct-93	31616		20000		15825	00-Jan-00									pbayou	HP	12742
bayouwq	WOJ9307	04-Oct-93	31616		4300		15826	00-Jan-00									pbayou	HP	12738
bayouwq	WOA9315	04-Oct-93	31616		5500		15827	00-Jan-00									pbayou	HP	12736
bayouwq	WOD9303	04-Oct-93	31616		1000		15829	00-Jan-00									pbayou	HP	12728
bayouwq	WOC9306	04-Oct-93	31616		700		15830	00-Jan-00									pbayou	HP	12726
bayouwq	WOB9306	04-Oct-93	31616		1300		15831	00-Jan-00									pbayou	HP	12724
bayouwq	WOA9316	20-Oct-93	31616		7400		15827	00-Jan-00								BM	pbayou	HP	12376
bayouwq	WOA9401	02-Feb-94	31616		7800		15827	00-Jan-00								BM	9495a	HP	30
bayouwq	WOA9402	08-Feb-94	31616		21000		15827	00-Jan-00									9495a	HP	182
bayouwq	WOL9401	03-Mar-94	31616		950		15824	00-Jan-00									9495a	HP	508
bayouwq	WOL9402	22-Mar-94	31616		4400		15824	00-Jan-00									9495a	HP	575
bayouwq	WOL9403	30-Mar-94	31616		16000		15824	00-Jan-00									9495a	HP	642
bayouwq	WOL9404	05-Apr-94	31616		21000		15824	00-Jan-00									9495a	HP	313
bayouwq	WOL9405	19-Apr-94	31616		20000		15824	00-Jan-00									9495a	HP	378
bayouwq	WOL9406	26-Apr-94	31616		3800		15824	00-Jan-00									9495a	HP	443
bayouwq	WOL9407	11-May-94	31616		4500		15824	00-Jan-00									9495a	HP	4196
bayouwq	WOL9408	17-May-94	31616		8700		15824	00-Jan-00									9495a	HP	4263
bayouwq	WOL9409	24-May-94	31616		2200		15824	00-Jan-00									9495a	HP	4331
bayouwq	WOL9410	07-Jun-94	31616		5900		15824	00-Jan-00									9495a	HP	879
bayouwq	WOM9401	08-Jun-94	31616		1900		11385	00-Jan-00									9495a	HP	1251
bayouwq	WOE9401	08-Jun-94	31616		370		11390	00-Jan-00									9495a	HP	1241
bayouwq	WOF9401	08-Jun-94	31616		390		11391	00-Jan-00									9495a	HP	1243
bayouwq	WOL9411	08-Jun-94	31616		1700		15824	00-Jan-00									9495a	HP	1255
bayouwq	WOK9401	08-Jun-94	31616		2800		15825	00-Jan-00									9495a	HP	1253
bayouwq	WOJ9401	08-Jun-94	31616		450		15826	00-Jan-00									9495a	HP	1249
bayouwq	WOA9403	08-Jun-94	31616		530		15827	00-Jan-00									9495a	HP	1247
bayouwq	WOD9401	08-Jun-94	31616		490		15829	00-Jan-00									9495a	HP	1239
bayouwq	WOC9401	08-Jun-94	31616		660		15830	00-Jan-00									9495a	HP	1237
bayouwq	WOB9401	08-Jun-94	31616		1200		15831	00-Jan-00									9495a	HP	1235
bayouwq	WOL9412	28-Jun-94	31616		3300		15824	00-Jan-00									9495a	HP	951
bayouwq	WOE9402	06-Jul-94	31616		89000		11390	00-Jan-00									9495a	HP	1759
bayouwq	WOF9402	06-Jul-94	31616		70000		11391	00-Jan-00									9495a	HP	1761
bayouwq	WOL9413	06-Jul-94	31616		200000		15824	00-Jan-00									9495a	HP	1773
bayouwq	WOK9402	06-Jul-94	31616		48000		15825	00-Jan-00									9495a	HP	1771
bayouwq	WOJ9402	06-Jul-94	31616		180000		15826	00-Jan-00									9495a	HP	1767
bayouwq	WOA9404	06-Jul-94	31616		110000		15827	00-Jan-00									9495a	HP	1765
bayouwq	WOD9402	06-Jul-94	31616		59000		15829	00-Jan-00									9495a	HP	1757
bayouwq	WOC9402	06-Jul-94	31616		86000		15830	00-Jan-00									9495a	HP	1755
bayouwq	WOB9402	06-Jul-94	31616		5700		15831	00-Jan-00									9495a	HP	1753
bayouwq	WOL9414	19-Jul-94	31616		780		15824	00-Jan-00									9495a	HP	1454
bayouwq	WOL9415	27-Jul-94	31616		1900		15824	00-Jan-00									9495a	HP	1522
bayouwq	WOE9403	03-Aug-94	31616		750		11390	00-Jan-00									9495a	HP	1813
bayouwq	WOF9403	03-Aug-94	31616		4600		11391	00-Jan-00									9495a	HP	1815
bayouwq	WOL9416	03-Aug-94	31616		15000		15824	00-Jan-00									9495a	HP	1827
bayouwq	WOK9403	03-Aug-94	31616		3600		15825	00-Jan-00									9495a	HP	1825

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	WOJ9403	03-Aug-94	31616		2200		15826	00-Jan-00									9495a	HP	1821
bayouwq	WOA9405	03-Aug-94	31616		1900		15827	00-Jan-00									9495a	HP	1819
bayouwq	WOD9403	03-Aug-94	31616		730		15829	00-Jan-00									9495a	HP	1811
bayouwq	WOC9403	03-Aug-94	31616		740		15830	00-Jan-00									9495a	HP	1809
bayouwq	WOB9403	03-Aug-94	31616		780		15831	00-Jan-00									9495a	HP	1807
bayouwq	WOL9417	06-Sep-94	31616		5200		15824	00-Jan-00									9495a	HP	1930
bayouwq	WOE9404	07-Sep-94	31616		6700		11390	00-Jan-00									9495a	HP	2336
bayouwq	WOF9404	07-Sep-94	31616		4800		11391	00-Jan-00									9495a	HP	2338
bayouwq	WOL9418	07-Sep-94	31616		7000		15824	00-Jan-00									9495a	HP	2350
bayouwq	WOK9404	07-Sep-94	31616		45000		15825	00-Jan-00									9495a	HP	2348
bayouwq	WOJ9404	07-Sep-94	31616		9500		15826	00-Jan-00									9495a	HP	2344
bayouwq	WOA9406	07-Sep-94	31616		6800		15827	00-Jan-00									9495a	HP	2342
bayouwq	WOD9404	07-Sep-94	31616		3700		15829	00-Jan-00									9495a	HP	2334
bayouwq	WOC9404	07-Sep-94	31616		4500		15830	00-Jan-00									9495a	HP	2332
bayouwq	WOB9404	07-Sep-94	31616		580		15831	00-Jan-00									9495a	HP	2330
bayouwq	WOL9419	27-Sep-94	31616		4800		15824	00-Jan-00									9495a	HP	2054
bayouwq	WOE9405	05-Oct-94	31616		620		11390	00-Jan-00									9495a	HP	2500
bayouwq	WOF9405	05-Oct-94	31616		3800		11391	00-Jan-00									9495a	HP	2502
bayouwq	WOL9420	05-Oct-94	31616		3500		15824	00-Jan-00									9495a	HP	2514
bayouwq	WOK9405	05-Oct-94	31616		8400		15825	00-Jan-00									9495a	HP	2512
bayouwq	WOJ9405	05-Oct-94	31616		820		15826	00-Jan-00									9495a	HP	2508
bayouwq	WOA9407	05-Oct-94	31616		1000		15827	00-Jan-00									9495a	HP	2506
bayouwq	WOD9405	05-Oct-94	31616		730		15829	00-Jan-00									9495a	HP	2498
bayouwq	WOC9405	05-Oct-94	31616		570		15830	00-Jan-00									9495a	HP	2496
bayouwq	WOB9405	05-Oct-94	31616		760		15831	00-Jan-00									9495a	HP	2494
bayouwq	WOL9421	15-Nov-94	31616		180		15824	00-Jan-00									9495a	HP	2726
bayouwq	WOM9402	16-Nov-94	31616		830		11385	00-Jan-00							BM		9495a	HP	2551
bayouwq	WOA9408	16-Nov-94	31616		62000		15827	00-Jan-00							BM		9495a	HP	2553
bayouwq	WOL9422	29-Nov-94	31616		3200		15824	00-Jan-00									9495a	HP	2789
bayouwq	WOE9406	30-Nov-94	31616		3200		11390	00-Jan-00							BM		9495a	HP	2658
bayouwq	WOA9409	30-Nov-94	31616		7500		15827	00-Jan-00							BM		9495a	HP	2650
bayouwq	WOL9501	17-Jan-95	31616		4500		15824	00-Jan-00									9495a	HP	2854
bayouwq	WOL9502	30-Jan-95	31616		25000		15824	00-Jan-00									9495a	HP	2923
bayouwq	WOM9501	02-Feb-95	31616		1100		11385	00-Jan-00							BM		9495a	HP	2966
bayouwq	WOA9501	02-Feb-95	31616		560		15827	00-Jan-00							BM		9495a	HP	2968
bayouwq	WOL9503	07-Feb-95	31616		7500		15824	00-Jan-00									9495a	HP	3084
bayouwq	WOM9502	08-Feb-95	31616		45000		11385	00-Jan-00							BM		9495a	HP	3011
bayouwq	WOA9502	08-Feb-95	31616		40000		15827	00-Jan-00							BM		9495a	HP	3013
bayouwq	WOL9504	27-Mar-95	31616		4800		15824	00-Jan-00									9495a	HP	3400
bayouwq	WOE9501	28-Mar-95	31616		1100		11390	00-Jan-00									9495a	HP	3538
bayouwq	WOF9501	28-Mar-95	31616		940		11391	00-Jan-00									9495a	HP	3540
bayouwq	WOL9505	28-Mar-95	31616		4800		15824	00-Jan-00									9495a	HP	3552
bayouwq	WOJ9501	28-Mar-95	31616		590		15826	00-Jan-00									9495a	HP	3546
bayouwq	WOA9503	28-Mar-95	31616		4700		15827	00-Jan-00									9495a	HP	3544
bayouwq	WOD9501	28-Mar-95	31616		4900		15829	00-Jan-00									9495a	HP	3536
bayouwq	WOC9501	28-Mar-95	31616		4800		15830	00-Jan-00									9495a	HP	3534
bayouwq	WOB9501	28-Mar-95	31616		510		15831	00-Jan-00									9495a	HP	3532
bayouwq	WOL9506	03-Apr-95	31616		3500		15824	00-Jan-00									9495a	HP	3658
bayouwq	WOE9502	24-Apr-95	31616		2500		11390	00-Jan-00									9495a	HP	3894
bayouwq	WOF9502	24-Apr-95	31616		1200		11391	00-Jan-00									9495a	HP	3896
bayouwq	WOL9507	24-Apr-95	31616		5200		15824	00-Jan-00									9495a	HP	3908
bayouwq	WOK9501	24-Apr-95	31616		6200		15825	00-Jan-00									9495a	HP	3906
bayouwq	WOJ9502	24-Apr-95	31616		1000		15826	00-Jan-00									9495a	HP	3902
bayouwq	WOA9504	24-Apr-95	31616		2300		15827	00-Jan-00									9495a	HP	3900
bayouwq	WOD9502	24-Apr-95	31616		820		15829	00-Jan-00									9495a	HP	3892
bayouwq	WOC9502	24-Apr-95	31616		950		15830	00-Jan-00									9495a	HP	3890
bayouwq	WOB9502	24-Apr-95	31616		2800		15831	00-Jan-00									9495a	HP	3888
bayouwq	WOA9505	26-Apr-95	31616		590		15827	00-Jan-00							BM		9495a	HP	3591

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	WOL9508	01-May-95	31616		1020		15824	00-Jan-00									9495a	HP	4128
bayouwq	WOE9503	02-May-95	31616		9000		11390	00-Jan-00									9495a	HP	4574
bayouwq	WOF9503	02-May-95	31616		19300		11391	00-Jan-00									9495a	HP	4576
bayouwq	WOL9509	02-May-95	31616		1100		15824	00-Jan-00									9495a	HP	4588
bayouwq	WOK9502	02-May-95	31616		4400		15825	00-Jan-00									9495a	HP	4586
bayouwq	WOJ9503	02-May-95	31616		3200		15826	00-Jan-00									9495a	HP	4582
bayouwq	WOA9506	02-May-95	31616		5300		15827	00-Jan-00									9495a	HP	4580
bayouwq	WOD9503	02-May-95	31616		1000		15829	00-Jan-00									9495a	HP	4572
bayouwq	WOC9503	02-May-95	31616		13000		15830	00-Jan-00									9495a	HP	4570
bayouwq	WOB9503	02-May-95	31616		1400		15831	00-Jan-00									9495a	HP	4568
bayouwq	WOA9507	23-May-95	31616		450		15827	00-Jan-00							BM		9495a	HP	3995
bayouwq	WOL9510	05-Jun-95	31616		7900		15824	00-Jan-00									9495b	HP	28
bayouwq	WOE9504	06-Jun-95	31616		7600		11390	00-Jan-00									9495a	HP	5279
bayouwq	WOF9504	06-Jun-95	31616		5800		11391	00-Jan-00									9495a	HP	5281
bayouwq	WOL9511	06-Jun-95	31616		9200		15824	00-Jan-00									9495a	HP	5293
bayouwq	WOK9503	06-Jun-95	31616		21000		15825	00-Jan-00									9495a	HP	5291
bayouwq	WOJ9504	06-Jun-95	31616		35000		15826	00-Jan-00									9495a	HP	5287
bayouwq	WOA9508	06-Jun-95	31616		65000		15827	00-Jan-00									9495a	HP	5285
bayouwq	WOD9504	06-Jun-95	31616		6500		15829	00-Jan-00									9495a	HP	5277
bayouwq	WOC9504	06-Jun-95	31616		7500		15830	00-Jan-00									9495a	HP	5275
bayouwq	WOB9504	06-Jun-95	31616		15000		15831	00-Jan-00									9495a	HP	5273
bayouwq	WOA9509	27-Jun-95	31616		4100		15827	00-Jan-00							BM		9495a	HP	4673
bayouwq	WOL9512	03-Jul-95	31616		4400		15824	00-Jan-00									9495a	HP	5510
bayouwq	WOE9505	05-Jul-95	31616		12000		11390	00-Jan-00									9495a	HP	5795
bayouwq	WOF9505	05-Jul-95	31616		21000		11391	00-Jan-00									9495a	HP	5797
bayouwq	WOL9513	05-Jul-95	31616		200000		15824	00-Jan-00									9495a	HP	5809
bayouwq	WOK9504	05-Jul-95	31616		10000		15825	00-Jan-00									9495a	HP	5807
bayouwq	WOJ9505	05-Jul-95	31616		10000		15826	00-Jan-00									9495a	HP	5803
bayouwq	WOA9510	05-Jul-95	31616		9700		15827	00-Jan-00									9495a	HP	5801
bayouwq	WOD9505	05-Jul-95	31616		9900		15829	00-Jan-00									9495a	HP	5793
bayouwq	WOC9505	05-Jul-95	31616		11000		15830	00-Jan-00									9495a	HP	5791
bayouwq	WOB9505	05-Jul-95	31616		15000		15831	00-Jan-00									9495a	HP	5789
bayouwq	WOA9511	31-Jul-95	31616		67000		15827	00-Jan-00							BM		9495a	HP	5379
bayouwq	WOE9506	10-Aug-95	31616		4100		11390	00-Jan-00									9495a	HP	5915
bayouwq	WOF9506	10-Aug-95	31616		4000		11391	00-Jan-00									9495a	HP	5917
bayouwq	WOL9514	10-Aug-95	31616		1700		15824	00-Jan-00									9495a	HP	5929
bayouwq	WOK9505	10-Aug-95	31616		4900		15825	00-Jan-00									9495a	HP	5927
bayouwq	WOJ9506	10-Aug-95	31616		5700		15826	00-Jan-00									9495a	HP	5923
bayouwq	WOA9512	10-Aug-95	31616		6800		15827	00-Jan-00									9495a	HP	5921
bayouwq	WOD9506	10-Aug-95	31616		680		15829	00-Jan-00									9495a	HP	5913
bayouwq	WOC9506	10-Aug-95	31616		900		15830	00-Jan-00									9495a	HP	5911
bayouwq	WOB9506	10-Aug-95	31616		2900		15831	00-Jan-00									9495a	HP	5909
bayouwq	WOL9515	14-Aug-95	31616		8400		15824	00-Jan-00									9495a	HP	5873
bayouwq	WOL9516	12-Sep-95	31616		200000		15824	00-Jan-00									9495b	HP	64
bayouwq	WOL9517	11-Oct-95	31616		9500		15824	00-Jan-00									9495b	HP	99
bayouwq	WOL9518	05-Dec-95	31616		5900		15824	00-Jan-00									9495b	HP	139
bayouwq	WOL9601	23-Jan-96	31616		12000		15824	00-Jan-00									xls96	HP	30
bayouwq	WOA9601	25-Jan-96	31616		16000		15827	00-Jan-00							BM		xls96	HP	57
bayouwq	WOL9602	05-Feb-96	31616		35000		15824	00-Jan-00									xls96	HP	97
bayouwq	WOE9601	08-Feb-96	31616		7200		11390	00-Jan-00									xls96	HP	122
bayouwq	WOF9601	08-Feb-96	31616		4400		11391	00-Jan-00									xls96	HP	123
bayouwq	WOL9603	08-Feb-96	31616		6600		15824	00-Jan-00									xls96	HP	128
bayouwq	WOK9601	08-Feb-96	31616		6800		15825	00-Jan-00									xls96	HP	127
bayouwq	WOJ9601	08-Feb-96	31616		11000		15826	00-Jan-00									xls96	HP	126
bayouwq	WOA9602	08-Feb-96	31616		6000		15827	00-Jan-00									xls96	HP	125
bayouwq	WOG9601	08-Feb-96	31616		7700		15828	00-Jan-00									xls96	HP	124
bayouwq	WOD9601	08-Feb-96	31616		590		15829	00-Jan-00									xls96	HP	121
bayouwq	WOC9601	08-Feb-96	31616		580		15830	00-Jan-00									xls96	HP	120

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	WOB9601	08-Feb-96	31616		2000		15831	00-Jan-00									xls96	HP	119
bayouwq	WOA9603	26-Feb-96	31616		140		15827	00-Jan-00								BM	xls96	HP	286
bayouwq	WOL9604	04-Mar-96	31616		3100		15824	00-Jan-00									xls96	HP	361
bayouwq	WOE9602	20-Mar-96	31616		6000		11390	00-Jan-00									xls96	HP	480
bayouwq	WOF9602	20-Mar-96	31616		6500		11391	00-Jan-00									xls96	HP	481
bayouwq	WOL9605	20-Mar-96	31616		10000		15824	00-Jan-00									xls96	HP	486
bayouwq	WOK9602	20-Mar-96	31616		8800		15825	00-Jan-00									xls96	HP	485
bayouwq	WOJ9602	20-Mar-96	31616		5400		15826	00-Jan-00									xls96	HP	484
bayouwq	WOA9604	20-Mar-96	31616		6400		15827	00-Jan-00									xls96	HP	483
bayouwq	WOG9602	20-Mar-96	31616		4900		15828	00-Jan-00									xls96	HP	482
bayouwq	WOD9602	20-Mar-96	31616		22000		15829	00-Jan-00									xls96	HP	479
bayouwq	WOC9602	20-Mar-96	31616		200		15830	00-Jan-00									xls96	HP	478
bayouwq	WOB9602	20-Mar-96	31616		160		15831	00-Jan-00									xls96	HP	477
bayouwq	WOA9605	28-Mar-96	31616		7100		15827	00-Jan-00								BM	xls96	HP	612
bayouwq	WOL9606	08-Apr-96	31616		3500		15824	00-Jan-00									xls96	HP	692
bayouwq	WOE9603	17-Apr-96	31616		1200		11390	00-Jan-00									xls96	HP	788
bayouwq	WOF9603	17-Apr-96	31616		960		11391	00-Jan-00									xls96	HP	789
bayouwq	WOL9607	17-Apr-96	31616		44000		15824	00-Jan-00									xls96	HP	793
bayouwq	WOK9603	17-Apr-96	31616		62000		15825	00-Jan-00									xls96	HP	792
bayouwq	WOJ9603	17-Apr-96	31616		61000		15826	00-Jan-00									xls96	HP	791
bayouwq	WOG9603	17-Apr-96	31616		2000		15828	00-Jan-00									xls96	HP	790
bayouwq	WOD9603	17-Apr-96	31616		1200		15829	00-Jan-00									xls96	HP	787
bayouwq	WOC9603	17-Apr-96	31616		450		15830	00-Jan-00									xls96	HP	786
bayouwq	WOB9603	17-Apr-96	31616		340		15831	00-Jan-00									xls96	HP	785
bayouwq	WOE9604	07-May-96	31616		1100		11390	00-Jan-00									xls96	HP	962
bayouwq	WOF9604	07-May-96	31616		1000		11391	00-Jan-00									xls96	HP	963
bayouwq	WOL9608	07-May-96	31616		6300		15824	00-Jan-00									xls96	HP	968
bayouwq	WOK9604	07-May-96	31616		4000		15825	00-Jan-00									xls96	HP	967
bayouwq	WOJ9604	07-May-96	31616		900		15826	00-Jan-00									xls96	HP	966
bayouwq	WOA9606	07-May-96	31616		2800		15827	00-Jan-00									xls96	HP	965
bayouwq	WOG9604	07-May-96	31616		1100		15828	00-Jan-00									xls96	HP	964
bayouwq	WOD9604	07-May-96	31616		1000		15829	00-Jan-00									xls96	HP	961
bayouwq	WOC9604	07-May-96	31616		910		15830	00-Jan-00									xls96	HP	960
bayouwq	WOB9604	07-May-96	31616		860		15831	00-Jan-00									xls96	HP	959
bayouwq	WOL9609	20-May-96	31616		450		15824	00-Jan-00									xls96	HP	1211
bayouwq	WOM9602	23-May-96	31616		420		11385	00-Jan-00								BM	xls96	HP	1236
bayouwq	WOA9608	23-May-96	31616		2600		15827	00-Jan-00								BM	xls96	HP	1237
bayouwq	WOL9610	05-Jun-96	31616		7900		15824	00-Jan-00									bayou95	HP	26
bayouwq	WOL9611	10-Jun-96	31616		1400		15824	00-Jan-00									xls96	HP	1353
bayouwq	WOM9603	11-Jun-96	31616		1200		11385	00-Jan-00									xls96	HP	1386
bayouwq	WOE9605	11-Jun-96	31616		1300		11390	00-Jan-00									xls96	HP	1381
bayouwq	WOF9605	11-Jun-96	31616		2200		11391	00-Jan-00									xls96	HP	1382
bayouwq	WOL9612	11-Jun-96	31616		7200		15824	00-Jan-00									xls96	HP	1388
bayouwq	WOK9605	11-Jun-96	31616		5800		15825	00-Jan-00									xls96	HP	1387
bayouwq	WOJ9605	11-Jun-96	31616		990		15826	00-Jan-00									xls96	HP	1385
bayouwq	WOA9609	11-Jun-96	31616		3600		15827	00-Jan-00									xls96	HP	1384
bayouwq	WOG9605	11-Jun-96	31616		1200		15828	00-Jan-00									xls96	HP	1383
bayouwq	WOD9605	11-Jun-96	31616		1200		15829	00-Jan-00									xls96	HP	1380
bayouwq	WOC9605	11-Jun-96	31616		2000		15830	00-Jan-00									xls96	HP	1379
bayouwq	WOB9605	11-Jun-96	31616		1000		15831	00-Jan-00									xls96	HP	1378
bayouwq	WOL9613	15-Jul-96	31616		3100		15824	00-Jan-00									xls96	HP	1633
bayouwq	WOM9605	17-Jul-96	31616		200000		11385	00-Jan-00									xls96	HP	1699
bayouwq	WOE9606	17-Jul-96	31616		200000		11390	00-Jan-00									xls96	HP	1694
bayouwq	WOF9606	17-Jul-96	31616		200000		11391	00-Jan-00									xls96	HP	1695
bayouwq	WOL9614	17-Jul-96	31616		100000		15824	00-Jan-00									xls96	HP	1701
bayouwq	WOK9606	17-Jul-96	31616		110000		15825	00-Jan-00									xls96	HP	1700
bayouwq	WOJ9606	17-Jul-96	31616		200000		15826	00-Jan-00									xls96	HP	1698
bayouwq	WOA9611	17-Jul-96	31616		200000		15827	00-Jan-00									xls96	HP	1697

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	WOG9606	17-Jul-96	31616		200000		15828	00-Jan-00									xls96	HP	1696
bayouwq	WOD9606	17-Jul-96	31616		200000		15829	00-Jan-00									xls96	HP	1693
bayouwq	WOC9606	17-Jul-96	31616		200000		15830	00-Jan-00									xls96	HP	1692
bayouwq	WOB9606	17-Jul-96	31616		200000		15831	00-Jan-00									xls96	HP	1691
bayouwq	WOE9607	21-Jul-96	31616		780		11390	00-Jan-00									xls96	HP	1893
bayouwq	WOC9607	21-Jul-96	31616		900		15830	00-Jan-00									xls96	HP	1891
bayouwq	WOM9606	29-Jul-96	31616		5200		11385	00-Jan-00								BM	xls96	HP	1862
bayouwq	WOA9612	29-Jul-96	31616		29000		15827	00-Jan-00								BM	xls96	HP	1863
bayouwq	WOL9615	31-Jul-96	31616		5500		15824	00-Jan-00									xls96	HP	1940
bayouwq	WOE9608	09-Aug-96	31616		4100		11390	00-Jan-00									bayou95	HP	58
bayouwq	WOF9607	09-Aug-96	31616		4000		11391	00-Jan-00									bayou95	HP	59
bayouwq	WOL9616	09-Aug-96	31616		1700		15824	00-Jan-00									bayou95	HP	64
bayouwq	WOK9607	09-Aug-96	31616		4900		15825	00-Jan-00									bayou95	HP	63
bayouwq	WOJ9607	09-Aug-96	31616		5700		15826	00-Jan-00									bayou95	HP	62
bayouwq	WOA9613	09-Aug-96	31616		6800		15827	00-Jan-00									bayou95	HP	61
bayouwq	WOG9607	09-Aug-96	31616		5800		15828	00-Jan-00									bayou95	HP	60
bayouwq	WOD9607	09-Aug-96	31616		680		15829	00-Jan-00									bayou95	HP	57
bayouwq	WOL9617	13-Aug-96	31616		26000		15824	00-Jan-00									xls96	HP	2045
bayouwq	WOL9618	14-Aug-96	31616		8400		15824	00-Jan-00									bayou95	HP	114
bayouwq	WOM9607	15-Aug-96	31616		2500		11385	00-Jan-00									xls96	HP	2074
bayouwq	WOE9609	15-Aug-96	31616		2100		11390	00-Jan-00									xls96	HP	2070
bayouwq	WOF9608	15-Aug-96	31616		3300		11391	00-Jan-00									xls96	HP	2071
bayouwq	WOL9619	15-Aug-96	31616		5400		15824	00-Jan-00									xls96	HP	2076
bayouwq	WOK9608	15-Aug-96	31616		5400		15825	00-Jan-00									xls96	HP	2075
bayouwq	WOJ9608	15-Aug-96	31616		24000		15826	00-Jan-00									xls96	HP	2073
bayouwq	WOG9608	15-Aug-96	31616		3900		15828	00-Jan-00									xls96	HP	2072
bayouwq	WOG9609	15-Aug-96	31616		4200		15828	00-Jan-00								QC	xls96	HP	2066
bayouwq	WOD9608	15-Aug-96	31616		2200		15829	00-Jan-00									xls96	HP	2069
bayouwq	WOC9608	15-Aug-96	31616		2100		15830	00-Jan-00									xls96	HP	2068
bayouwq	WOB9607	15-Aug-96	31616		2700		15831	00-Jan-00									xls96	HP	2067
bayouwq	WOM9608	10-Sep-96	31616		26000		11385	00-Jan-00									xls96	HP	2299
bayouwq	WOE9610	10-Sep-96	31616		3200		11390	00-Jan-00									xls96	HP	2295
bayouwq	WOF9609	10-Sep-96	31616		5900		11391	00-Jan-00									xls96	HP	2296
bayouwq	WOF9610	10-Sep-96	31616		4400		11391	00-Jan-00								QC	xls96	HP	2291
bayouwq	WOL9620	10-Sep-96	31616		2500		15824	00-Jan-00									xls96	HP	2301
bayouwq	WOK9609	10-Sep-96	31616		160		15825	00-Jan-00									xls96	HP	2300
bayouwq	WOJ9609	10-Sep-96	31616		370		15826	00-Jan-00									xls96	HP	2298
bayouwq	WOG9610	10-Sep-96	31616		150		15828	00-Jan-00									xls96	HP	2297
bayouwq	WOD9609	10-Sep-96	31616		4300		15829	00-Jan-00									xls96	HP	2294
bayouwq	WOC9609	10-Sep-96	31616		4600		15830	00-Jan-00									xls96	HP	2293
bayouwq	WOB9608	10-Sep-96	31616		5900		15831	00-Jan-00									xls96	HP	2292
bayouwq	WOL9621	12-Sep-96	31616		200000		15824	00-Jan-00									bayou95	HP	187
bayouwq	WOE9611	13-Sep-96	31616		15000		11390	00-Jan-00									bayou95	HP	207
bayouwq	WOF9611	13-Sep-96	31616		32000		11391	00-Jan-00									bayou95	HP	208
bayouwq	WOL9622	13-Sep-96	31616		31000		15824	00-Jan-00									bayou95	HP	213
bayouwq	WOK9610	13-Sep-96	31616		37000		15825	00-Jan-00									bayou95	HP	212
bayouwq	WOJ9610	13-Sep-96	31616		54000		15826	00-Jan-00									bayou95	HP	211
bayouwq	WOA9614	13-Sep-96	31616		57000		15827	00-Jan-00									bayou95	HP	210
bayouwq	WOG9611	13-Sep-96	31616		56000		15828	00-Jan-00									bayou95	HP	209
bayouwq	WOD9610	13-Sep-96	31616		2800		15829	00-Jan-00									bayou95	HP	206
bayouwq	WOC9610	13-Sep-96	31616		3200		15830	00-Jan-00									bayou95	HP	205
bayouwq	WOB9609	13-Sep-96	31616		41000		15831	00-Jan-00									bayou95	HP	204
bayouwq	WOM9609	26-Sep-96	31616		3800		11385	00-Jan-00								BM	bayou95	HP	320
bayouwq	WOA9615	26-Sep-96	31616		4000		15827	00-Jan-00								BM	bayou95	HP	321
bayouwq	WOL9623	27-Sep-96	31616		11000		15824	00-Jan-00									bayou95	HP	356
bayouwq	WOL9624	07-Oct-96	31616		4800		15824	00-Jan-00									xls96	HP	2472
bayouwq	WOE9612	09-Oct-96	31616		9100		11390	00-Jan-00									bayou95	HP	492
bayouwq	WOF9612	09-Oct-96	31616		6700		11391	00-Jan-00									bayou95	HP	493

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	WOL9625	09-Oct-96	31616		4700		15824	00-Jan-00									bayou95	HP	498
bayouwq	WOK9611	09-Oct-96	31616		7600		15825	00-Jan-00									bayou95	HP	497
bayouwq	WOJ9611	09-Oct-96	31616		4000		15826	00-Jan-00									bayou95	HP	496
bayouwq	WOA9616	09-Oct-96	31616		3600		15827	00-Jan-00									bayou95	HP	495
bayouwq	WOG9612	09-Oct-96	31616		5600		15828	00-Jan-00									bayou95	HP	494
bayouwq	WOD9611	09-Oct-96	31616		9700		15829	00-Jan-00									bayou95	HP	491
bayouwq	WOC9611	09-Oct-96	31616		8400		15830	00-Jan-00									bayou95	HP	490
bayouwq	WOB9610	09-Oct-96	31616		3000		15831	00-Jan-00									bayou95	HP	489
bayouwq	WOL9626	11-Oct-96	31616		9500		15824	00-Jan-00									bayou95	HP	548
bayouwq	WOM9610	23-Oct-96	31616		1200		11385	00-Jan-00							BM		bayou95	HP	132
bayouwq	WOA9617	23-Oct-96	31616		26000		15827	00-Jan-00							BM		bayou95	HP	133
bayouwq	WOM9611	28-Oct-96	31616		6000		11385	00-Jan-00									xls96	HP	2606
bayouwq	WOE9613	28-Oct-96	31616		26000		11390	00-Jan-00									xls96	HP	2602
bayouwq	WOF9613	28-Oct-96	31616		8600		11391	00-Jan-00									xls96	HP	2603
bayouwq	WOF9614	28-Oct-96	31616		22000		11391	00-Jan-00							QC		xls96	HP	2598
bayouwq	WOL9627	28-Oct-96	31616		42500		15824	00-Jan-00									xls96	HP	2608
bayouwq	WOK9612	28-Oct-96	31616		58000		15825	00-Jan-00									xls96	HP	2607
bayouwq	WOJ9612	28-Oct-96	31616		27000		15826	00-Jan-00									xls96	HP	2605
bayouwq	WOG9613	28-Oct-96	31616		25000		15828	00-Jan-00									xls96	HP	2604
bayouwq	WOD9612	28-Oct-96	31616		2800		15829	00-Jan-00									xls96	HP	2601
bayouwq	WOC9612	28-Oct-96	31616		3400		15830	00-Jan-00									xls96	HP	2600
bayouwq	WOB9611	28-Oct-96	31616		3600		15831	00-Jan-00									xls96	HP	2599
bayouwq	WOM9612	30-Oct-96	31616		5300		11385	00-Jan-00							BM		xls96	HP	2697
bayouwq	WOL9628	04-Nov-96	31616		5900		15824	00-Jan-00									xls96	HP	2740
bayouwq	WOM9613	05-Nov-96	31616		5900		11385	00-Jan-00									xls96	HP	2769
bayouwq	WOE9614	05-Nov-96	31616		3400		11390	00-Jan-00									xls96	HP	2765
bayouwq	WOF9615	05-Nov-96	31616		2700		11391	00-Jan-00									xls96	HP	2766
bayouwq	WOL9629	05-Nov-96	31616		200000		15824	00-Jan-00									xls96	HP	2771
bayouwq	WOK9613	05-Nov-96	31616		5500		15825	00-Jan-00									xls96	HP	2770
bayouwq	WOJ9613	05-Nov-96	31616		3200		15826	00-Jan-00									xls96	HP	2768
bayouwq	WOG9614	05-Nov-96	31616		2400		15828	00-Jan-00							QC		xls96	HP	2761
bayouwq	WOG9615	05-Nov-96	31616		3300		15828	00-Jan-00									xls96	HP	2767
bayouwq	WOD9613	05-Nov-96	31616		580		15829	00-Jan-00									xls96	HP	2764
bayouwq	WOC9613	05-Nov-96	31616		720		15830	00-Jan-00									xls96	HP	2763
bayouwq	WOB9612	05-Nov-96	31616		760		15831	00-Jan-00									xls96	HP	2762
bayouwq	WOL9630	06-Nov-96	31616		59000		15824	00-Jan-00									bayou95	HP	653
bayouwq	WOE9615	07-Nov-96	31616		3700		11390	00-Jan-00									bayou95	HP	675
bayouwq	WOF9616	07-Nov-96	31616		5700		11391	00-Jan-00									bayou95	HP	676
bayouwq	WOL9631	07-Nov-96	31616		100000		15824	00-Jan-00									bayou95	HP	681
bayouwq	WOK9614	07-Nov-96	31616		45000		15825	00-Jan-00									bayou95	HP	680
bayouwq	WOJ9614	07-Nov-96	31616		110000		15826	00-Jan-00									bayou95	HP	679
bayouwq	WOA9618	07-Nov-96	31616		7100		15827	00-Jan-00									bayou95	HP	678
bayouwq	WOG9616	07-Nov-96	31616		7500		15828	00-Jan-00									bayou95	HP	677
bayouwq	WOD9614	07-Nov-96	31616		3500		15829	00-Jan-00									bayou95	HP	674
bayouwq	WOC9614	07-Nov-96	31616		3600		15830	00-Jan-00									bayou95	HP	673
bayouwq	WOB9613	07-Nov-96	31616		4400		15831	00-Jan-00									bayou95	HP	672
bayouwq	WOM9614	20-Nov-96	31616		59000		11385	00-Jan-00							BM		xls96	HP	2956
bayouwq	WOE9616	05-Dec-96	31616		5300		11390	00-Jan-00									bayou95	HP	942
bayouwq	WOF9617	05-Dec-96	31616		4100		11391	00-Jan-00									bayou95	HP	943
bayouwq	WOL9633	05-Dec-96	31616		5900		15824	00-Jan-00									bayou95	HP	919
bayouwq	WOK9615	05-Dec-96	31616		5600		15825	00-Jan-00									bayou95	HP	947
bayouwq	WOJ9615	05-Dec-96	31616		1300		15826	00-Jan-00									bayou95	HP	946
bayouwq	WOA9620	05-Dec-96	31616		1100		15827	00-Jan-00									bayou95	HP	945
bayouwq	WOG9617	05-Dec-96	31616		3200		15828	00-Jan-00									bayou95	HP	944
bayouwq	WOD9615	05-Dec-96	31616		640		15829	00-Jan-00									bayou95	HP	941
bayouwq	WOC9615	05-Dec-96	31616		780		15830	00-Jan-00									bayou95	HP	940
bayouwq	WOB9614	05-Dec-96	31616		980		15831	00-Jan-00									bayou95	HP	939
bayouwq	WOL9634	10-Dec-96	31616		1900		15824	00-Jan-00									xls96	HP	3101

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	WOM9615	11-Dec-96	31616		2200		11385	00-Jan-00									xls96	HP	3133
bayouwq	WOE9617	11-Dec-96	31616		3700		11390	00-Jan-00									xls96	HP	3129
bayouwq	WOF9618	11-Dec-96	31616		2100		11391	00-Jan-00									xls96	HP	3130
bayouwq	WOL9635	11-Dec-96	31616		100000		15824	00-Jan-00									xls96	HP	3135
bayouwq	WOK9616	11-Dec-96	31616		4600		15825	00-Jan-00									xls96	HP	3134
bayouwq	WOJ9616	11-Dec-96	31616		2500		15826	00-Jan-00									xls96	HP	3132
bayouwq	WOG9618	11-Dec-96	31616		2700		15828	00-Jan-00									xls96	HP	3131
bayouwq	WOG9619	11-Dec-96	31616		2000		15828	00-Jan-00							QC		xls96	HP	3125
bayouwq	WOD9616	11-Dec-96	31616		480		15829	00-Jan-00									xls96	HP	3128
bayouwq	WOC9616	11-Dec-96	31616		540		15830	00-Jan-00									xls96	HP	3127
bayouwq	WOB9615	11-Dec-96	31616		640		15831	00-Jan-00									xls96	HP	3126
bayouwq	WOM9616	18-Dec-96	31616		70000		11385	00-Jan-00							BM		xls96	HP	3222
bayouwq	BUA8701	05-Jan-87	31616		900		11351	00-Jan-00									pothor1	HP	9758
bayouwq	BUO8701	05-Jan-87	31616		750		11354	00-Jan-00									pothor1	HP	9756
bayouwq	BUM8701	05-Jan-87	31616		20		11357	00-Jan-00									pothor1	HP	9753
bayouwq	BUJ8701	05-Jan-87	31616		20		11360	00-Jan-00									pothor1	HP	9750
bayouwq	BUH8701	05-Jan-87	31616		40		11362	00-Jan-00									pothor1	HP	9748
bayouwq	BUD8701	05-Jan-87	31616		30		11364	00-Jan-00									pothor1	HP	9746
bayouwq	BUX8701	05-Jan-87	31616		30		15840	00-Jan-00									pothor1	HP	9767
bayouwq	BUW8701	05-Jan-87	31616		11200		15841	00-Jan-00									pothor1	HP	9764
bayouwq	BUU8701	05-Jan-87	31616		34000		15842	00-Jan-00									pothor1	HP	9762
bayouwq	BUS8701	05-Jan-87	31616		28000		15843	00-Jan-00									pothor1	HP	9761
bayouwq	BUL8701	05-Jan-87	31616		840		15846	00-Jan-00									pothor1	HP	9752
bayouwq	BUG8701	05-Jan-87	31616		20		15847	00-Jan-00									pothor1	HP	9747
bayouwq	BUB9001	05-Jan-90	31616		600		11142	00-Jan-00									pothor1	HP	10439
bayouwq	BUE9001	05-Jan-90	31616		640		11163	00-Jan-00									pothor1	HP	10443
bayouwq	BUA9001	05-Jan-90	31616		3200		11351	00-Jan-00									pothor1	HP	10463
bayouwq	BUO9001	05-Jan-90	31616		1300		11354	00-Jan-00									pothor1	HP	10459
bayouwq	BUM9001	05-Jan-90	31616		18		11357	00-Jan-00									pothor1	HP	10455
bayouwq	BUK9001	05-Jan-90	31616		370		11359	00-Jan-00									pothor1	HP	10451
bayouwq	BUJ9001	05-Jan-90	31616		230		11360	00-Jan-00									pothor1	HP	10449
bayouwq	BUH9001	05-Jan-90	31616		9		11362	00-Jan-00									pothor1	HP	10447
bayouwq	BUD9001	05-Jan-90	31616		280		11364	00-Jan-00									pothor1	HP	10441
bayouwq	BUX9001	05-Jan-90	31616		9		15840	00-Jan-00									pothor1	HP	10475
bayouwq	BUW9001	05-Jan-90	31616		3000		15841	00-Jan-00									pothor1	HP	10471
bayouwq	BUU9001	05-Jan-90	31616		5400		15842	00-Jan-00									pothor1	HP	10469
bayouwq	BUS9001	05-Jan-90	31616		2800		15843	00-Jan-00									pothor1	HP	10465
bayouwq	BUQ9001	05-Jan-90	31616		1200		15844	00-Jan-00									pothor1	HP	10461
bayouwq	BUN9001	05-Jan-90	31616		1300		15845	00-Jan-00									pothor1	HP	10457
bayouwq	BUL9001	05-Jan-90	31616		140		15846	00-Jan-00									pothor1	HP	10453
bayouwq	BUG9001	05-Jan-90	31616		870		15847	00-Jan-00									pothor1	HP	10445
bayouwq	BUA8501	08-Jan-85	31616		34000		11351	00-Jan-00									pothor1	HP	9310
bayouwq	BUO8501	08-Jan-85	31616		30000		11354	00-Jan-00									pothor1	HP	9308
bayouwq	BUM8501	08-Jan-85	31616		122000		11357	00-Jan-00									pothor1	HP	9305
bayouwq	BUK8501	08-Jan-85	31616		100		11359	00-Jan-00									pothor1	HP	9303
bayouwq	BUJ8501	08-Jan-85	31616		1		11360	00-Jan-00									pothor1	HP	9302
bayouwq	BUH8501	08-Jan-85	31616		1		11362	00-Jan-00									pothor1	HP	9300
bayouwq	BUX8501	08-Jan-85	31616		1		15840	00-Jan-00									pothor1	HP	9319
bayouwq	BUW8501	08-Jan-85	31616		56300		15841	00-Jan-00									pothor1	HP	9316
bayouwq	BUU8501	08-Jan-85	31616		56300		15842	00-Jan-00									pothor1	HP	9314
bayouwq	BUS8501	08-Jan-85	31616		37300		15843	00-Jan-00									pothor1	HP	9313
bayouwq	BUB9002	12-Jan-90	31616		91		11142	00-Jan-00									pothor1	HP	10510
bayouwq	BUE9002	12-Jan-90	31616		550		11163	00-Jan-00									pothor1	HP	10514
bayouwq	BUA9002	12-Jan-90	31616		4300		11351	00-Jan-00									pothor1	HP	10534
bayouwq	BUO9002	12-Jan-90	31616		110		11354	00-Jan-00									pothor1	HP	10530
bayouwq	BUM9002	12-Jan-90	31616		9		11357	00-Jan-00									pothor1	HP	10526
bayouwq	BUK9002	12-Jan-90	31616		54		11359	00-Jan-00									pothor1	HP	10522
bayouwq	BUJ9002	12-Jan-90	31616		18		11360	00-Jan-00									pothor1	HP	10520

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUH9002	12-Jan-90	31616		230		11362	00-Jan-00									pothe1	HP	10518
bayouwq	BUD9002	12-Jan-90	31616		840		11364	00-Jan-00									pothe1	HP	10512
bayouwq	BUX9002	12-Jan-90	31616		140		15840	00-Jan-00									pothe1	HP	10546
bayouwq	BUW9002	12-Jan-90	31616		2700		15841	00-Jan-00									pothe1	HP	10542
bayouwq	BUU9002	12-Jan-90	31616		5900		15842	00-Jan-00									pothe1	HP	10540
bayouwq	BUS9002	12-Jan-90	31616		11000		15843	00-Jan-00									pothe1	HP	10536
bayouwq	BUQ9002	12-Jan-90	31616		5300		15844	00-Jan-00									pothe1	HP	10532
bayouwq	BUN9002	12-Jan-90	31616		150		15845	00-Jan-00									pothe1	HP	10528
bayouwq	BUL9002	12-Jan-90	31616		9		15846	00-Jan-00									pothe1	HP	10524
bayouwq	BUG9002	12-Jan-90	31616		150		15847	00-Jan-00									pothe1	HP	10516
bayouwq	BUE9101	14-Jan-91	31616		730		11163	00-Jan-00									pothe1	HP	1427
bayouwq	BUA9101	14-Jan-91	31616		2800		11351	00-Jan-00									pothe1	HP	1449
bayouwq	BUO9101	14-Jan-91	31616		4000		11354	00-Jan-00									pothe1	HP	1443
bayouwq	BUM9101	14-Jan-91	31616		3900		11357	00-Jan-00									pothe1	HP	1439
bayouwq	BUK9101	14-Jan-91	31616		3500		11359	00-Jan-00									pothe1	HP	1435
bayouwq	BUJ9101	14-Jan-91	31616		3300		11360	00-Jan-00									pothe1	HP	1433
bayouwq	BUH9101	14-Jan-91	31616		710		11362	00-Jan-00									pothe1	HP	1431
bayouwq	BUD9101	14-Jan-91	31616		930		11364	00-Jan-00									pothe1	HP	1425
bayouwq	BUW9101	14-Jan-91	31616		3500		15841	00-Jan-00									pothe1	HP	1457
bayouwq	BUU9101	14-Jan-91	31616		3900		15842	00-Jan-00									pothe1	HP	1455
bayouwq	BUS9101	14-Jan-91	31616		3100		15843	00-Jan-00									pothe1	HP	1451
bayouwq	BUQ9101	14-Jan-91	31616		4700		15844	00-Jan-00									pothe1	HP	1447
bayouwq	BUN9101	14-Jan-91	31616		4800		15845	00-Jan-00									pothe1	HP	1441
bayouwq	BUL9101	14-Jan-91	31616		2500		15846	00-Jan-00									pothe1	HP	1437
bayouwq	BUG9101	14-Jan-91	31616		400		15847	00-Jan-00									pothe1	HP	1429
bayouwq	BUB9501	17-Jan-95	31616		320		11142	00-Jan-00									9495a	HP	2820
bayouwq	BUE9501	17-Jan-95	31616		610		11163	00-Jan-00									9495a	HP	2826
bayouwq	BUV9501	17-Jan-95	31616		1000		11345	00-Jan-00									9495a	HP	2856
bayouwq	BUA9501	17-Jan-95	31616		760	BM	11351	00-Jan-00							BM		9495a	HP	2850
bayouwq	BUP9501	17-Jan-95	31616		590		11353	00-Jan-00									9495a	HP	2848
bayouwq	BUJ9501	17-Jan-95	31616		610		11360	00-Jan-00									9495a	HP	2836
bayouwq	BUI9501	17-Jan-95	31616		480		11361	00-Jan-00									9495a	HP	2834
bayouwq	BUH9501	17-Jan-95	31616		560		11362	00-Jan-00									9495a	HP	2832
bayouwq	BUF9501	17-Jan-95	31616		620		11363	00-Jan-00									9495a	HP	2828
bayouwq	BUD9501	17-Jan-95	31616		400		11364	00-Jan-00									9495a	HP	2824
bayouwq	BUW9501	17-Jan-95	31616		900		15841	00-Jan-00									9495a	HP	2858
bayouwq	BUS9501	17-Jan-95	31616		870		15843	00-Jan-00									9495a	HP	2852
bayouwq	BUN9501	17-Jan-95	31616		750		15845	00-Jan-00									9495a	HP	2844
bayouwq	BUL9501	17-Jan-95	31616		560		15846	00-Jan-00									9495a	HP	2840
bayouwq	BUV8301	19-Jan-83	31616		28000		11345	00-Jan-00									pothe1	HP	8901
bayouwq	BUA8301	19-Jan-83	31616		20000		11351	00-Jan-00									pothe1	HP	8896
bayouwq	BUM8301	19-Jan-83	31616		18000		11357	00-Jan-00									pothe1	HP	8891
bayouwq	BUJ8301	19-Jan-83	31616		2000		11360	00-Jan-00									pothe1	HP	8888
bayouwq	BUH8301	19-Jan-83	31616		5000		11362	00-Jan-00									pothe1	HP	8886
bayouwq	BUX8301	19-Jan-83	31616		2000		15840	00-Jan-00									pothe1	HP	8905
bayouwq	BUW8301	19-Jan-83	31616		33000		15841	00-Jan-00									pothe1	HP	8902
bayouwq	BUS8301	19-Jan-83	31616		26000		15843	00-Jan-00									pothe1	HP	8899
bayouwq	BUQ8301	19-Jan-83	31616		13000		15844	00-Jan-00									pothe1	HP	8895
bayouwq	BUA8601	22-Jan-86	31616		3900		11351	00-Jan-00									pothe1	HP	9566
bayouwq	BUO8601	22-Jan-86	31616		12900		11354	00-Jan-00									pothe1	HP	9564
bayouwq	BUM8601	22-Jan-86	31616		53000		11357	00-Jan-00									pothe1	HP	9561
bayouwq	BUK8601	22-Jan-86	31616		40		11359	00-Jan-00									pothe1	HP	9559
bayouwq	BUJ8601	22-Jan-86	31616		410		11360	00-Jan-00									pothe1	HP	9558
bayouwq	BUH8601	22-Jan-86	31616		1		11362	00-Jan-00									pothe1	HP	9556
bayouwq	BUX8601	22-Jan-86	31616		10		15840	00-Jan-00									pothe1	HP	9575
bayouwq	BUW8601	22-Jan-86	31616		1070		15841	00-Jan-00									pothe1	HP	9572
bayouwq	BUU8601	22-Jan-86	31616		1610		15842	00-Jan-00									pothe1	HP	9570
bayouwq	BUS8601	22-Jan-86	31616		3000		15843	00-Jan-00									pothe1	HP	9569

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUL8601	22-Jan-86	31616		290		15846	00-Jan-00									pothe1	HP	9560
bayouwq	BUB9003	22-Jan-90	31616		680		11142	00-Jan-00									pothe1	HP	10581
bayouwq	BUE9003	22-Jan-90	31616		530		11163	00-Jan-00									pothe1	HP	10585
bayouwq	BUA9003	22-Jan-90	31616		850		11351	00-Jan-00									pothe1	HP	10605
bayouwq	BUO9003	22-Jan-90	31616		190		11354	00-Jan-00									pothe1	HP	10601
bayouwq	BUM9003	22-Jan-90	31616		9		11357	00-Jan-00									pothe1	HP	10597
bayouwq	BUK9003	22-Jan-90	31616		290		11359	00-Jan-00									pothe1	HP	10593
bayouwq	BUJ9003	22-Jan-90	31616		27		11360	00-Jan-00									pothe1	HP	10591
bayouwq	BUH9003	22-Jan-90	31616		54		11362	00-Jan-00									pothe1	HP	10589
bayouwq	BUD9003	22-Jan-90	31616		1600		11364	00-Jan-00									pothe1	HP	10583
bayouwq	BUX9003	22-Jan-90	31616		480		15840	00-Jan-00									pothe1	HP	10617
bayouwq	BUW9003	22-Jan-90	31616		4900		15841	00-Jan-00									pothe1	HP	10613
bayouwq	BUU9003	22-Jan-90	31616		7000		15842	00-Jan-00									pothe1	HP	10611
bayouwq	BUS9003	22-Jan-90	31616		9300		15843	00-Jan-00									pothe1	HP	10607
bayouwq	BUQ9003	22-Jan-90	31616		730		15844	00-Jan-00									pothe1	HP	10603
bayouwq	BUN9003	22-Jan-90	31616		1100		15845	00-Jan-00									pothe1	HP	10599
bayouwq	BUL9003	22-Jan-90	31616		72		15846	00-Jan-00									pothe1	HP	10595
bayouwq	BUG9003	22-Jan-90	31616		410		15847	00-Jan-00									pothe1	HP	10587
bayouwq	BUB9601	23-Jan-96	31616		2500		11142	00-Jan-00									xls96	HP	14
bayouwq	BUE9601	23-Jan-96	31616		2000		11163	00-Jan-00									xls96	HP	16
bayouwq	BUV9601	23-Jan-96	31616		2500		11345	00-Jan-00									xls96	HP	31
bayouwq	BUA9601	23-Jan-96	31616		5700	BM	11351	00-Jan-00							BM		xls96	HP	28
bayouwq	BUP9601	23-Jan-96	31616		320		11353	00-Jan-00									xls96	HP	26
bayouwq	BUO9601	23-Jan-96	31616		1800		11354	00-Jan-00									xls96	HP	25
bayouwq	BUM9601	23-Jan-96	31616		2800		11357	00-Jan-00									xls96	HP	23
bayouwq	BUK9601	23-Jan-96	31616		490		11359	00-Jan-00									xls96	HP	21
bayouwq	BUJ9601	23-Jan-96	31616		550		11360	00-Jan-00									xls96	HP	20
bayouwq	BUI9601	23-Jan-96	31616		730		11361	00-Jan-00									xls96	HP	19
bayouwq	BUH9601	23-Jan-96	31616		4400		11362	00-Jan-00									xls96	HP	18
bayouwq	BUF9601	23-Jan-96	31616		290		11363	00-Jan-00									xls96	HP	17
bayouwq	BUD9601	23-Jan-96	31616		210		11364	00-Jan-00									xls96	HP	15
bayouwq	BUX9601	23-Jan-96	31616		2700		15840	00-Jan-00									xls96	HP	32
bayouwq	BUS9601	23-Jan-96	31616		7500		15843	00-Jan-00									xls96	HP	29
bayouwq	BUQ9601	23-Jan-96	31616		280		15844	00-Jan-00									xls96	HP	27
bayouwq	BUN9601	23-Jan-96	31616		3500		15845	00-Jan-00									xls96	HP	24
bayouwq	BUL9601	23-Jan-96	31616		590		15846	00-Jan-00									xls96	HP	22
bayouwq	BUA9602	25-Jan-96	31616		3400	BM	11351	00-Jan-00							BM		xls96	HP	53
bayouwq	BUB9004	29-Jan-90	31616		6200		11142	00-Jan-00									pothe1	HP	10652
bayouwq	BUE9004	29-Jan-90	31616		3400		11163	00-Jan-00									pothe1	HP	10656
bayouwq	BUA9004	29-Jan-90	31616		18500		11351	00-Jan-00									pothe1	HP	10676
bayouwq	BUO9004	29-Jan-90	31616		3500		11354	00-Jan-00									pothe1	HP	10672
bayouwq	BUM9004	29-Jan-90	31616		940		11357	00-Jan-00									pothe1	HP	10668
bayouwq	BUK9004	29-Jan-90	31616		110		11359	00-Jan-00									pothe1	HP	10664
bayouwq	BUJ9004	29-Jan-90	31616		2100		11360	00-Jan-00									pothe1	HP	10662
bayouwq	BUH9004	29-Jan-90	31616		3400		11362	00-Jan-00									pothe1	HP	10660
bayouwq	BUD9004	29-Jan-90	31616		4300		11364	00-Jan-00									pothe1	HP	10654
bayouwq	BUX9004	29-Jan-90	31616		9		15840	00-Jan-00									pothe1	HP	10688
bayouwq	BUW9004	29-Jan-90	31616		11000		15841	00-Jan-00									pothe1	HP	10684
bayouwq	BUU9004	29-Jan-90	31616		20000		15842	00-Jan-00									pothe1	HP	10682
bayouwq	BUS9004	29-Jan-90	31616		15000		15843	00-Jan-00									pothe1	HP	10678
bayouwq	BUQ9004	29-Jan-90	31616		22000		15844	00-Jan-00									pothe1	HP	10674
bayouwq	BUN9004	29-Jan-90	31616		2700		15845	00-Jan-00									pothe1	HP	10670
bayouwq	BUL9004	29-Jan-90	31616		350		15846	00-Jan-00									pothe1	HP	10666
bayouwq	BUG9004	29-Jan-90	31616		200		15847	00-Jan-00									pothe1	HP	10658
bayouwq	BUE9502	30-Jan-95	31616		560		11163	00-Jan-00									9495a	HP	2893
bayouwq	BUA9502	30-Jan-95	31616		600	BM	11351	00-Jan-00							BM		9495a	HP	2919
bayouwq	BUP9502	30-Jan-95	31616		540		11353	00-Jan-00									9495a	HP	2915
bayouwq	BUO9501	30-Jan-95	31616		360		11354	00-Jan-00									9495a	HP	2913

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUM9501	30-Jan-95	31616		340		11357	00-Jan-00									9495a	HP	2909
bayouwq	BUK9501	30-Jan-95	31616		360		11359	00-Jan-00									9495a	HP	2905
bayouwq	BUJ9502	30-Jan-95	31616		340		11360	00-Jan-00									9495a	HP	2903
bayouwq	BUI9502	30-Jan-95	31616		380		11361	00-Jan-00									9495a	HP	2901
bayouwq	BUH9502	30-Jan-95	31616		280		11362	00-Jan-00									9495a	HP	2899
bayouwq	BUF9502	30-Jan-95	31616		290		11363	00-Jan-00									9495a	HP	2895
bayouwq	BUD9502	30-Jan-95	31616		270		11364	00-Jan-00									9495a	HP	2891
bayouwq	BUX9501	30-Jan-95	31616		1400		15840	00-Jan-00									9495a	HP	2929
bayouwq	BUW9502	30-Jan-95	31616		2900		15841	00-Jan-00									9495a	HP	2927
bayouwq	BUS9502	30-Jan-95	31616		630		15843	00-Jan-00									9495a	HP	2921
bayouwq	BUQ9501	30-Jan-95	31616		530		15844	00-Jan-00									9495a	HP	2917
bayouwq	BUN9502	30-Jan-95	31616		440		15845	00-Jan-00									9495a	HP	2911
bayouwq	BUL9502	30-Jan-95	31616		400		15846	00-Jan-00									9495a	HP	2907
bayouwq	BUG9501	30-Jan-95	31616		160		15847	00-Jan-00									9495a	HP	2897
bayouwq	BUV8401	31-Jan-84	31616		20000		11345	00-Jan-00									pothel	HP	9123
bayouwq	BUA8401	31-Jan-84	31616		8000		11351	00-Jan-00									pothel	HP	9118
bayouwq	BUO8401	31-Jan-84	31616		43000		11354	00-Jan-00									pothel	HP	9116
bayouwq	BUM8401	31-Jan-84	31616		1000		11357	00-Jan-00									pothel	HP	9113
bayouwq	BUJ8401	31-Jan-84	31616		2000		11360	00-Jan-00									pothel	HP	9110
bayouwq	BUH8401	31-Jan-84	31616		1		11362	00-Jan-00									pothel	HP	9108
bayouwq	BUX8401	31-Jan-84	31616		1		15840	00-Jan-00									pothel	HP	9127
bayouwq	BUS8401	31-Jan-84	31616		16000		15843	00-Jan-00									pothel	HP	9121
bayouwq	BUB8902	02-Feb-89	31616		680		11142	00-Jan-00									pothel	HP	10061
bayouwq	BUA8902	02-Feb-89	31616		9800		11351	00-Jan-00									pothel	HP	10069
bayouwq	BUO8902	02-Feb-89	31616		740		11354	00-Jan-00									pothel	HP	10068
bayouwq	BUM8902	02-Feb-89	31616		90		11357	00-Jan-00									pothel	HP	10067
bayouwq	BUJ8902	02-Feb-89	31616		10		11360	00-Jan-00									pothel	HP	10065
bayouwq	BUH8902	02-Feb-89	31616		110		11362	00-Jan-00									pothel	HP	10064
bayouwq	BUD8902	02-Feb-89	31616		540		11364	00-Jan-00									pothel	HP	10062
bayouwq	BUX8902	02-Feb-89	31616		2900		15840	00-Jan-00									pothel	HP	10074
bayouwq	BUU8902	02-Feb-89	31616		41000		15842	00-Jan-00									pothel	HP	10072
bayouwq	BUS8902	02-Feb-89	31616		23000		15843	00-Jan-00									pothel	HP	10070
bayouwq	BUL8902	02-Feb-89	31616		1400		15846	00-Jan-00									pothel	HP	10066
bayouwq	BUG8902	02-Feb-89	31616		60		15847	00-Jan-00									pothel	HP	10063
bayouwq	BUA9401	02-Feb-94	31616		3700	BM	11351	00-Jan-00							BM		9495a	HP	32
bayouwq	BUA9503	02-Feb-95	31616		120	BM	11351	00-Jan-00							BM		9495a	HP	2970
bayouwq	BUE9602	05-Feb-96	31616		140		11163	00-Jan-00									xls96	HP	84
bayouwq	BUV9602	05-Feb-96	31616		7500		11345	00-Jan-00									xls96	HP	98
bayouwq	BUA9603	05-Feb-96	31616		1100	QC	11351	00-Jan-00							QC		xls96	HP	82
bayouwq	BUP9602	05-Feb-96	31616		2500		11353	00-Jan-00									xls96	HP	93
bayouwq	BUO9602	05-Feb-96	31616		2100		11354	00-Jan-00									xls96	HP	92
bayouwq	BUM9602	05-Feb-96	31616		1800		11357	00-Jan-00									xls96	HP	90
bayouwq	BUK9602	05-Feb-96	31616		3700		11359	00-Jan-00									xls96	HP	88
bayouwq	BUJ9602	05-Feb-96	31616		1900		11360	00-Jan-00									xls96	HP	87
bayouwq	BUI9602	05-Feb-96	31616		1800		11361	00-Jan-00									xls96	HP	86
bayouwq	BUH9602	05-Feb-96	31616		360		11362	00-Jan-00									xls96	HP	85
bayouwq	BUD9602	05-Feb-96	31616		250		11364	00-Jan-00									xls96	HP	83
bayouwq	BUX9602	05-Feb-96	31616		420		15840	00-Jan-00									xls96	HP	99
bayouwq	BUS9602	05-Feb-96	31616		950		15843	00-Jan-00									xls96	HP	96
bayouwq	BUQ9602	05-Feb-96	31616		490		15844	00-Jan-00									xls96	HP	94
bayouwq	BUN9602	05-Feb-96	31616		2600		15845	00-Jan-00									xls96	HP	91
bayouwq	BUL9602	05-Feb-96	31616		2700		15846	00-Jan-00									xls96	HP	89
bayouwq	BUB9005	06-Feb-90	31616		1300		11142	00-Jan-00									pothel	HP	10723
bayouwq	BUE9005	06-Feb-90	31616		670		11163	00-Jan-00									pothel	HP	10727
bayouwq	BUA9005	06-Feb-90	31616		4600		11351	00-Jan-00									pothel	HP	10747
bayouwq	BUO9005	06-Feb-90	31616		150		11354	00-Jan-00									pothel	HP	10743
bayouwq	BUM9005	06-Feb-90	31616		9		11357	00-Jan-00									pothel	HP	10739
bayouwq	BUH9005	06-Feb-90	31616		560		11362	00-Jan-00									pothel	HP	10731

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUD9005	06-Feb-90	31616		4500		11364	00-Jan-00									poth1	HP	10725
bayouwq	BUX9005	06-Feb-90	31616		99		15840	00-Jan-00									poth1	HP	10759
bayouwq	BUW9005	06-Feb-90	31616		12000		15841	00-Jan-00									poth1	HP	10755
bayouwq	BUU9005	06-Feb-90	31616		15000		15842	00-Jan-00									poth1	HP	10753
bayouwq	BUS9005	06-Feb-90	31616		9900		15843	00-Jan-00									poth1	HP	10749
bayouwq	BUQ9005	06-Feb-90	31616		4600		15844	00-Jan-00									poth1	HP	10745
bayouwq	BUN9005	06-Feb-90	31616		600		15845	00-Jan-00									poth1	HP	10741
bayouwq	BUG9005	06-Feb-90	31616		640		15847	00-Jan-00									poth1	HP	10729
bayouwq	BUE9503	07-Feb-95	31616		220		11163	00-Jan-00									9495a	HP	3054
bayouwq	BUV9502	07-Feb-95	31616		3300		11345	00-Jan-00									9495a	HP	3086
bayouwq	BUA9504	07-Feb-95	31616		560	BM	11351	00-Jan-00							BM		9495a	HP	3080
bayouwq	BUP9503	07-Feb-95	31616		320		11353	00-Jan-00									9495a	HP	3076
bayouwq	BUO9502	07-Feb-95	31616		580		11354	00-Jan-00									9495a	HP	3074
bayouwq	BUM9502	07-Feb-95	31616		480		11357	00-Jan-00									9495a	HP	3070
bayouwq	BUK9502	07-Feb-95	31616		1100		11359	00-Jan-00									9495a	HP	3066
bayouwq	BUJ9503	07-Feb-95	31616		920		11360	00-Jan-00									9495a	HP	3064
bayouwq	BUI9503	07-Feb-95	31616		1300		11361	00-Jan-00									9495a	HP	3062
bayouwq	BUH9503	07-Feb-95	31616		2000		11362	00-Jan-00									9495a	HP	3060
bayouwq	BUF9503	07-Feb-95	31616		180		11363	00-Jan-00									9495a	HP	3056
bayouwq	BUD9503	07-Feb-95	31616		280		11364	00-Jan-00									9495a	HP	3052
bayouwq	BUW9503	07-Feb-95	31616		1100		15841	00-Jan-00									9495a	HP	3088
bayouwq	BUS9503	07-Feb-95	31616		3600		15843	00-Jan-00									9495a	HP	3082
bayouwq	BUQ9502	07-Feb-95	31616		4000		15844	00-Jan-00									9495a	HP	3078
bayouwq	BUN9503	07-Feb-95	31616		1100		15845	00-Jan-00									9495a	HP	3072
bayouwq	BUL9503	07-Feb-95	31616		710		15846	00-Jan-00									9495a	HP	3068
bayouwq	BUG9502	07-Feb-95	31616		120		15847	00-Jan-00									9495a	HP	3058
bayouwq	BUA9402	08-Feb-94	31616		3100		11351	00-Jan-00									9495a	HP	184
bayouwq	BUA9505	08-Feb-95	31616		25000	BM	11351	00-Jan-00							BM		9495a	HP	3015
bayouwq	BUV9603	08-Feb-96	31616		2600		11345	00-Jan-00									xls96	HP	129
bayouwq	BUA9102	13-Feb-91	31616		3000		11351	00-Jan-00									pbayou	HP	581
bayouwq	BUO9102	13-Feb-91	31616		550		11354	00-Jan-00									pbayou	HP	575
bayouwq	BUK9102	13-Feb-91	31616		200		11359	00-Jan-00									pbayou	HP	567
bayouwq	BUJ9102	13-Feb-91	31616		240		11360	00-Jan-00									pbayou	HP	565
bayouwq	BUH9102	13-Feb-91	31616		63		11362	00-Jan-00									pbayou	HP	563
bayouwq	BUD9102	13-Feb-91	31616		27		11364	00-Jan-00									pbayou	HP	557
bayouwq	BUW9102	13-Feb-91	31616		3200		15841	00-Jan-00									pbayou	HP	589
bayouwq	BUS9102	13-Feb-91	31616		4500		15843	00-Jan-00									pbayou	HP	583
bayouwq	BUN9102	13-Feb-91	31616		300		15845	00-Jan-00									pbayou	HP	573
bayouwq	BUL9102	13-Feb-91	31616		180		15846	00-Jan-00									pbayou	HP	569
bayouwq	BUB9006	15-Feb-90	31616		2300		11142	00-Jan-00									poth1	HP	10794
bayouwq	BUE9006	15-Feb-90	31616		880		11163	00-Jan-00									poth1	HP	10798
bayouwq	BUA9006	15-Feb-90	31616		9850		11351	00-Jan-00									poth1	HP	10818
bayouwq	BUO9006	15-Feb-90	31616		140000		11354	00-Jan-00									poth1	HP	10814
bayouwq	BUM9006	15-Feb-90	31616		240		11357	00-Jan-00									poth1	HP	10810
bayouwq	BUK9005	15-Feb-90	31616		2100		11359	00-Jan-00									poth1	HP	10806
bayouwq	BUJ9005	15-Feb-90	31616		57000		11360	00-Jan-00									poth1	HP	10804
bayouwq	BUH9006	15-Feb-90	31616		2300		11362	00-Jan-00									poth1	HP	10802
bayouwq	BUD9006	15-Feb-90	31616		1500		11364	00-Jan-00									poth1	HP	10796
bayouwq	BUX9006	15-Feb-90	31616		800		15840	00-Jan-00									poth1	HP	10830
bayouwq	BUW9006	15-Feb-90	31616		7200		15841	00-Jan-00									poth1	HP	10826
bayouwq	BUU9006	15-Feb-90	31616		29000		15842	00-Jan-00									poth1	HP	10824
bayouwq	BUS9006	15-Feb-90	31616		23000		15843	00-Jan-00									poth1	HP	10820
bayouwq	BUQ9006	15-Feb-90	31616		11000		15844	00-Jan-00									poth1	HP	10816
bayouwq	BUN9006	15-Feb-90	31616		20000		15845	00-Jan-00									poth1	HP	10812
bayouwq	BUL9005	15-Feb-90	31616		52000		15846	00-Jan-00									poth1	HP	10808
bayouwq	BUG9006	15-Feb-90	31616		14000		15847	00-Jan-00									poth1	HP	10800
bayouwq	BUA9103	18-Feb-91	31616		9400		11351	00-Jan-00									pbayou	HP	654
bayouwq	BUO9103	18-Feb-91	31616		400		11354	00-Jan-00									pbayou	HP	648

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUJ9103	18-Feb-91	31616		18		11360	00-Jan-00									pbayou	HP	638
bayouwq	BUH9103	18-Feb-91	31616		36		11362	00-Jan-00									pbayou	HP	636
bayouwq	BUW9103	18-Feb-91	31616		2000		15841	00-Jan-00									pbayou	HP	662
bayouwq	BUS9103	18-Feb-91	31616		5300		15843	00-Jan-00									pbayou	HP	656
bayouwq	BUN9103	18-Feb-91	31616		220		15845	00-Jan-00									pbayou	HP	646
bayouwq	BUL9103	18-Feb-91	31616		63		15846	00-Jan-00									pbayou	HP	642
bayouwq	BUB9007	23-Feb-90	31616		14000		11142	00-Jan-00									pothorl	HP	10865
bayouwq	BUE9007	23-Feb-90	31616		10000		11163	00-Jan-00									pothorl	HP	10869
bayouwq	BUA9007	23-Feb-90	31616		6000		11351	00-Jan-00									pothorl	HP	10889
bayouwq	BUO9007	23-Feb-90	31616		6900		11354	00-Jan-00									pothorl	HP	10885
bayouwq	BUM9007	23-Feb-90	31616		8400		11357	00-Jan-00									pothorl	HP	10881
bayouwq	BUK9006	23-Feb-90	31616		5700		11359	00-Jan-00									pothorl	HP	10877
bayouwq	BUJ9006	23-Feb-90	31616		5400		11360	00-Jan-00									pothorl	HP	10875
bayouwq	BUH9007	23-Feb-90	31616		8500		11362	00-Jan-00									pothorl	HP	10873
bayouwq	BUD9007	23-Feb-90	31616		9100		11364	00-Jan-00									pothorl	HP	10867
bayouwq	BUX9007	23-Feb-90	31616		4300		15840	00-Jan-00									pothorl	HP	10901
bayouwq	BUW9007	23-Feb-90	31616		8300		15841	00-Jan-00									pothorl	HP	10897
bayouwq	BUU9007	23-Feb-90	31616		4900		15842	00-Jan-00									pothorl	HP	10895
bayouwq	BUS9007	23-Feb-90	31616		7400		15843	00-Jan-00									pothorl	HP	10891
bayouwq	BUQ9007	23-Feb-90	31616		5400		15844	00-Jan-00									pothorl	HP	10887
bayouwq	BUN9007	23-Feb-90	31616		5300		15845	00-Jan-00									pothorl	HP	10883
bayouwq	BUL9006	23-Feb-90	31616		5900		15846	00-Jan-00									pothorl	HP	10879
bayouwq	BUG9007	23-Feb-90	31616		3400		15847	00-Jan-00									pothorl	HP	10871
bayouwq	BUA8602	24-Feb-86	31616		5200		11351	00-Jan-00									pothorl	HP	9598
bayouwq	BUO8602	24-Feb-86	31616		17600		11354	00-Jan-00									pothorl	HP	9596
bayouwq	BUM8602	24-Feb-86	31616		11300		11357	00-Jan-00									pothorl	HP	9593
bayouwq	BUJ8602	24-Feb-86	31616		10		11360	00-Jan-00									pothorl	HP	9590
bayouwq	BUH8602	24-Feb-86	31616		80		11362	00-Jan-00									pothorl	HP	9588
bayouwq	BUD8601	24-Feb-86	31616		50		11364	00-Jan-00									pothorl	HP	9586
bayouwq	BUX8602	24-Feb-86	31616		90		15840	00-Jan-00									pothorl	HP	9607
bayouwq	BUW8602	24-Feb-86	31616		1200		15841	00-Jan-00									pothorl	HP	9604
bayouwq	BUU8602	24-Feb-86	31616		5000		15842	00-Jan-00									pothorl	HP	9602
bayouwq	BUS8602	24-Feb-86	31616		7000		15843	00-Jan-00									pothorl	HP	9601
bayouwq	BUL8602	24-Feb-86	31616		30		15846	00-Jan-00									pothorl	HP	9592
bayouwq	BUA9104	25-Feb-91	31616		25000		11351	00-Jan-00									pbayou	HP	727
bayouwq	BUO9104	25-Feb-91	31616		1800		11354	00-Jan-00									pbayou	HP	721
bayouwq	BUJ9104	25-Feb-91	31616		1200		11360	00-Jan-00									pbayou	HP	711
bayouwq	BUH9104	25-Feb-91	31616		2700		11362	00-Jan-00									pbayou	HP	709
bayouwq	BUD9103	25-Feb-91	31616		680		11364	00-Jan-00									pbayou	HP	703
bayouwq	BUW9104	25-Feb-91	31616		7600		15841	00-Jan-00									pbayou	HP	735
bayouwq	BUS9104	25-Feb-91	31616		12000		15843	00-Jan-00									pbayou	HP	729
bayouwq	BUN9104	25-Feb-91	31616		2600		15845	00-Jan-00									pbayou	HP	719
bayouwq	BUL9104	25-Feb-91	31616		2500		15846	00-Jan-00									pbayou	HP	715
bayouwq	BUA9604	26-Feb-96	31616		4700	BM	11351	00-Jan-00							BM		xls96	HP	287
bayouwq	BUV8402	28-Feb-84	31616		500		11345	00-Jan-00									pothorl	HP	9155
bayouwq	BUA8402	28-Feb-84	31616		40500		11351	00-Jan-00									pothorl	HP	9150
bayouwq	BUO8402	28-Feb-84	31616		12000		11354	00-Jan-00									pothorl	HP	9148
bayouwq	BUM8402	28-Feb-84	31616		1500		11357	00-Jan-00									pothorl	HP	9145
bayouwq	BUJ8402	28-Feb-84	31616		500		11360	00-Jan-00									pothorl	HP	9142
bayouwq	BUH8402	28-Feb-84	31616		4000		11362	00-Jan-00									pothorl	HP	9140
bayouwq	BUX8402	28-Feb-84	31616		1		15840	00-Jan-00									pothorl	HP	9159
bayouwq	BUW8401	28-Feb-84	31616		1		15841	00-Jan-00									pothorl	HP	9156
bayouwq	BUU8401	28-Feb-84	31616		8000		15842	00-Jan-00									pothorl	HP	9154
bayouwq	BUS8402	28-Feb-84	31616		26000		15843	00-Jan-00									pothorl	HP	9153
bayouwq	BUN8401	28-Feb-84	31616		1500		15845	00-Jan-00									pothorl	HP	9146
bayouwq	BUA8502	28-Feb-85	31616		16600		11351	00-Jan-00									pothorl	HP	9342
bayouwq	BUM8502	28-Feb-85	31616		8000		11357	00-Jan-00									pothorl	HP	9337
bayouwq	BUK8502	28-Feb-85	31616		1110		11359	00-Jan-00									pothorl	HP	9335

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUJ8502	28-Feb-85	31616		1400		11360	00-Jan-00									poth1	HP	9334
bayouwq	BUH8502	28-Feb-85	31616		18000		11362	00-Jan-00									poth1	HP	9332
bayouwq	BUX8502	28-Feb-85	31616		14100		15840	00-Jan-00									poth1	HP	9351
bayouwq	BUW8502	28-Feb-85	31616		18000		15841	00-Jan-00									poth1	HP	9348
bayouwq	BUU8502	28-Feb-85	31616		17600		15842	00-Jan-00									poth1	HP	9346
bayouwq	BUS8502	28-Feb-85	31616		13300		15843	00-Jan-00									poth1	HP	9345
bayouwq	BUN8501	28-Feb-85	31616		13000		15845	00-Jan-00									poth1	HP	9338
bayouwq	BUL8501	28-Feb-85	31616		8000		15846	00-Jan-00									poth1	HP	9336
bayouwq	BUB9008	28-Feb-90	31616		400		11142	00-Jan-00									poth1	HP	10936
bayouwq	BUE9008	28-Feb-90	31616		1200		11163	00-Jan-00									poth1	HP	10940
bayouwq	BUA9008	28-Feb-90	31616		2000		11351	00-Jan-00									poth1	HP	10960
bayouwq	BUO9008	28-Feb-90	31616		1400		11354	00-Jan-00									poth1	HP	10956
bayouwq	BUM9008	28-Feb-90	31616		1100		11357	00-Jan-00									poth1	HP	10952
bayouwq	BUK9007	28-Feb-90	31616		340		11359	00-Jan-00									poth1	HP	10948
bayouwq	BUJ9007	28-Feb-90	31616		340		11360	00-Jan-00									poth1	HP	10946
bayouwq	BUH9008	28-Feb-90	31616		700		11362	00-Jan-00									poth1	HP	10944
bayouwq	BUD9008	28-Feb-90	31616		680		11364	00-Jan-00									poth1	HP	10938
bayouwq	BUX9008	28-Feb-90	31616		770		15840	00-Jan-00									poth1	HP	10972
bayouwq	BUW9008	28-Feb-90	31616		30000		15841	00-Jan-00									poth1	HP	10968
bayouwq	BUU9008	28-Feb-90	31616		5000		15842	00-Jan-00									poth1	HP	10966
bayouwq	BUS9008	28-Feb-90	31616		1100		15843	00-Jan-00									poth1	HP	10962
bayouwq	BUQ9008	28-Feb-90	31616		1600		15844	00-Jan-00									poth1	HP	10958
bayouwq	BUN9008	28-Feb-90	31616		3400		15845	00-Jan-00									poth1	HP	10954
bayouwq	BUL9007	28-Feb-90	31616		300		15846	00-Jan-00									poth1	HP	10950
bayouwq	BUG9008	28-Feb-90	31616		730		15847	00-Jan-00									poth1	HP	10942
bayouwq	BUC9401	03-Mar-94	31616		230		11142	00-Jan-00									9495a	HP	478
bayouwq	BUV9401	03-Mar-94	31616		990		11345	00-Jan-00									9495a	HP	512
bayouwq	BUA9403	03-Mar-94	31616		1000		11351	00-Jan-00									9495a	HP	504
bayouwq	BUP9401	03-Mar-94	31616		340		11353	00-Jan-00									9495a	HP	500
bayouwq	BUO9401	03-Mar-94	31616		260		11354	00-Jan-00									9495a	HP	498
bayouwq	BUM9401	03-Mar-94	31616		190		11357	00-Jan-00									9495a	HP	494
bayouwq	BUK9401	03-Mar-94	31616		110		11359	00-Jan-00									9495a	HP	490
bayouwq	BUX9401	03-Mar-94	31616		3000		15840	00-Jan-00									9495a	HP	516
bayouwq	BUW9401	03-Mar-94	31616		1100		15841	00-Jan-00									9495a	HP	514
bayouwq	BUU9401	03-Mar-94	31616		14000		15842	00-Jan-00									9495a	HP	510
bayouwq	BUS9401	03-Mar-94	31616		770		15843	00-Jan-00									9495a	HP	506
bayouwq	BUQ9401	03-Mar-94	31616		940		15844	00-Jan-00									9495a	HP	502
bayouwq	BUN9401	03-Mar-94	31616		280		15845	00-Jan-00									9495a	HP	496
bayouwq	BUL9401	03-Mar-94	31616		220		15846	00-Jan-00									9495a	HP	492
bayouwq	BUG9401	03-Mar-94	31616		370		15847	00-Jan-00									9495a	HP	484
bayouwq	BUB9101	04-Mar-91	31616		450		11142	00-Jan-00									pbayou	HP	1134
bayouwq	BUE9102	04-Mar-91	31616		550		11163	00-Jan-00									pbayou	HP	1138
bayouwq	BUA9105	04-Mar-91	31616		7000		11351	00-Jan-00									pbayou	HP	1160
bayouwq	BUO9105	04-Mar-91	31616		2400		11354	00-Jan-00									pbayou	HP	1154
bayouwq	BUM9102	04-Mar-91	31616		940		11357	00-Jan-00									pbayou	HP	1150
bayouwq	BUK9103	04-Mar-91	31616		1300		11359	00-Jan-00									pbayou	HP	1146
bayouwq	BUJ9105	04-Mar-91	31616		530		11360	00-Jan-00									pbayou	HP	1144
bayouwq	BUH9105	04-Mar-91	31616		620		11362	00-Jan-00									pbayou	HP	1142
bayouwq	BUD9104	04-Mar-91	31616		330		11364	00-Jan-00									pbayou	HP	1136
bayouwq	BUW9105	04-Mar-91	31616		3100		15841	00-Jan-00									pbayou	HP	1168
bayouwq	BUS9105	04-Mar-91	31616		4200		15843	00-Jan-00									pbayou	HP	1162
bayouwq	BUQ9102	04-Mar-91	31616		7000		15844	00-Jan-00									pbayou	HP	1158
bayouwq	BUN9105	04-Mar-91	31616		9000		15845	00-Jan-00									pbayou	HP	1152
bayouwq	BUL9105	04-Mar-91	31616		880		15846	00-Jan-00									pbayou	HP	1148
bayouwq	BUG9102	04-Mar-91	31616		260		15847	00-Jan-00									pbayou	HP	1140
bayouwq	BUE9603	04-Mar-96	31616		210		11163	00-Jan-00									xls96	HP	348
bayouwq	BUV9604	04-Mar-96	31616		1500		11345	00-Jan-00									xls96	HP	362
bayouwq	BUA9605	04-Mar-96	31616		1100	BM	11351	00-Jan-00								BM	xls96	HP	359

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUP9603	04-Mar-96	31616		930		11353	00-Jan-00									xls96	HP	357
bayouwq	BUO9603	04-Mar-96	31616		560		11354	00-Jan-00									xls96	HP	356
bayouwq	BUM9603	04-Mar-96	31616		1000		11357	00-Jan-00									xls96	HP	355
bayouwq	BUK9603	04-Mar-96	31616		2800		11359	00-Jan-00									xls96	HP	353
bayouwq	BUJ9603	04-Mar-96	31616		2300		11360	00-Jan-00									xls96	HP	352
bayouwq	BUI9603	04-Mar-96	31616		860		11361	00-Jan-00									xls96	HP	365
bayouwq	BUH9603	04-Mar-96	31616		430		11362	00-Jan-00									xls96	HP	351
bayouwq	BUF9602	04-Mar-96	31616		250		11363	00-Jan-00									xls96	HP	349
bayouwq	BUD9603	04-Mar-96	31616		470		11364	00-Jan-00									xls96	HP	347
bayouwq	BUX9603	04-Mar-96	31616		34000		15840	00-Jan-00									xls96	HP	364
bayouwq	BUW9601	04-Mar-96	31616		2100		15841	00-Jan-00									xls96	HP	363
bayouwq	BUS9603	04-Mar-96	31616		3600		15843	00-Jan-00									xls96	HP	360
bayouwq	BUQ9603	04-Mar-96	31616		840		15844	00-Jan-00									xls96	HP	358
bayouwq	BUN9603	04-Mar-96	31616		1100		15845	00-Jan-00									xls96	HP	366
bayouwq	BUL9603	04-Mar-96	31616		2000		15846	00-Jan-00									xls96	HP	354
bayouwq	BUG9601	04-Mar-96	31616		310		15847	00-Jan-00									xls96	HP	350
bayouwq	BUB8903	06-Mar-89	31616		210		11142	00-Jan-00									poth1	HP	10084
bayouwq	BUA8903	06-Mar-89	31616		4900		11351	00-Jan-00									poth1	HP	10094
bayouwq	BUP8901	06-Mar-89	31616		9900		11353	00-Jan-00									poth1	HP	10092
bayouwq	BUM8903	06-Mar-89	31616		10		11357	00-Jan-00									poth1	HP	10090
bayouwq	BUJ8903	06-Mar-89	31616		9		11360	00-Jan-00									poth1	HP	10088
bayouwq	BUH8903	06-Mar-89	31616		780		11362	00-Jan-00									poth1	HP	10087
bayouwq	BUX8903	06-Mar-89	31616		200		15840	00-Jan-00									poth1	HP	10099
bayouwq	BUW8901	06-Mar-89	31616		5400		15841	00-Jan-00									poth1	HP	10098
bayouwq	BUU8903	06-Mar-89	31616		8900		15842	00-Jan-00									poth1	HP	10097
bayouwq	BUS8903	06-Mar-89	31616		10000		15843	00-Jan-00									poth1	HP	10095
bayouwq	BUQ8901	06-Mar-89	31616		310		15844	00-Jan-00									poth1	HP	10093
bayouwq	BUN8901	06-Mar-89	31616		210		15845	00-Jan-00									poth1	HP	10091
bayouwq	BUL8903	06-Mar-89	31616		10		15846	00-Jan-00									poth1	HP	10089
bayouwq	BUG8903	06-Mar-89	31616		72		15847	00-Jan-00									poth1	HP	10086
bayouwq	BUB9009	08-Mar-90	31616		200		11142	00-Jan-00									poth1	HP	11007
bayouwq	BUE9009	08-Mar-90	31616		590		11163	00-Jan-00									poth1	HP	11011
bayouwq	BUA9009	08-Mar-90	31616		800		11351	00-Jan-00									poth1	HP	11031
bayouwq	BUO9009	08-Mar-90	31616		670		11354	00-Jan-00									poth1	HP	11027
bayouwq	BUM9009	08-Mar-90	31616		18		11357	00-Jan-00									poth1	HP	11023
bayouwq	BUK9008	08-Mar-90	31616		22000		11359	00-Jan-00									poth1	HP	11019
bayouwq	BUJ9008	08-Mar-90	31616		25000		11360	00-Jan-00									poth1	HP	11017
bayouwq	BUH9009	08-Mar-90	31616		14000		11362	00-Jan-00									poth1	HP	11015
bayouwq	BUD9009	08-Mar-90	31616		1800		11364	00-Jan-00									poth1	HP	11009
bayouwq	BUX9009	08-Mar-90	31616		36		15840	00-Jan-00									poth1	HP	11043
bayouwq	BUW9009	08-Mar-90	31616		8500		15841	00-Jan-00									poth1	HP	11039
bayouwq	BUU9009	08-Mar-90	31616		11000		15842	00-Jan-00									poth1	HP	11037
bayouwq	BUS9009	08-Mar-90	31616		2500		15843	00-Jan-00									poth1	HP	11033
bayouwq	BUQ9009	08-Mar-90	31616		300		15844	00-Jan-00									poth1	HP	11029
bayouwq	BUN9009	08-Mar-90	31616		760		15845	00-Jan-00									poth1	HP	11025
bayouwq	BUL9008	08-Mar-90	31616		8000		15846	00-Jan-00									poth1	HP	11021
bayouwq	BUG9009	08-Mar-90	31616		620		15847	00-Jan-00									poth1	HP	11013
bayouwq	BUB9010	20-Mar-90	31616		570		11142	00-Jan-00									poth1	HP	11078
bayouwq	BUE9010	20-Mar-90	31616		230		11163	00-Jan-00									poth1	HP	11082
bayouwq	BUA9010	20-Mar-90	31616		4200		11351	00-Jan-00									poth1	HP	11102
bayouwq	BUO9010	20-Mar-90	31616		170		11354	00-Jan-00									poth1	HP	11098
bayouwq	BUM9010	20-Mar-90	31616		9		11357	00-Jan-00									poth1	HP	11094
bayouwq	BUK9009	20-Mar-90	31616		54		11359	00-Jan-00									poth1	HP	11090
bayouwq	BUJ9009	20-Mar-90	31616		390		11360	00-Jan-00									poth1	HP	11088
bayouwq	BUH9010	20-Mar-90	31616		260		11362	00-Jan-00									poth1	HP	11086
bayouwq	BUD9010	20-Mar-90	31616		140		11364	00-Jan-00									poth1	HP	11080
bayouwq	BUX9010	20-Mar-90	31616		99		15840	00-Jan-00									poth1	HP	11114
bayouwq	BUW9010	20-Mar-90	31616		27000		15841	00-Jan-00									poth1	HP	11110

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUU9010	20-Mar-90	31616		130000		15842	00-Jan-00									pothe1	HP	11108
bayouwq	BUS9010	20-Mar-90	31616		3100		15843	00-Jan-00									pothe1	HP	11104
bayouwq	BUQ9010	20-Mar-90	31616		2100		15844	00-Jan-00									pothe1	HP	11100
bayouwq	BUN9010	20-Mar-90	31616		120		15845	00-Jan-00									pothe1	HP	11096
bayouwq	BUL9009	20-Mar-90	31616		72		15846	00-Jan-00									pothe1	HP	11092
bayouwq	BUG9010	20-Mar-90	31616		670		15847	00-Jan-00									pothe1	HP	11084
bayouwq	BUB9102	20-Mar-91	31616		330		11142	00-Jan-00									pbayou	HP	1207
bayouwq	BUE9103	20-Mar-91	31616		280		11163	00-Jan-00									pbayou	HP	1211
bayouwq	BUA9106	20-Mar-91	31616		5300		11351	00-Jan-00									pbayou	HP	1233
bayouwq	BUP9101	20-Mar-91	31616		3300		11353	00-Jan-00									pbayou	HP	1229
bayouwq	BUO9106	20-Mar-91	31616		3600		11354	00-Jan-00									pbayou	HP	1227
bayouwq	BUM9103	20-Mar-91	31616		660		11357	00-Jan-00									pbayou	HP	1223
bayouwq	BUK9104	20-Mar-91	31616		300		11359	00-Jan-00									pbayou	HP	1219
bayouwq	BUJ9106	20-Mar-91	31616		18		11360	00-Jan-00									pbayou	HP	1217
bayouwq	BUH9106	20-Mar-91	31616		570		11362	00-Jan-00									pbayou	HP	1215
bayouwq	BUD9105	20-Mar-91	31616		410		11364	00-Jan-00									pbayou	HP	1209
bayouwq	BUW9106	20-Mar-91	31616		9200		15841	00-Jan-00									pbayou	HP	1241
bayouwq	BUU9102	20-Mar-91	31616		6400		15842	00-Jan-00									pbayou	HP	1239
bayouwq	BUS9106	20-Mar-91	31616		4800		15843	00-Jan-00									pbayou	HP	1235
bayouwq	BUQ9103	20-Mar-91	31616		4200		15844	00-Jan-00									pbayou	HP	1231
bayouwq	BUN9106	20-Mar-91	31616		5700		15845	00-Jan-00									pbayou	HP	1225
bayouwq	BUL9106	20-Mar-91	31616		260		15846	00-Jan-00									pbayou	HP	1221
bayouwq	BUG9103	20-Mar-91	31616		240		15847	00-Jan-00									pbayou	HP	1213
bayouwq	BUE9604	21-Mar-96	31616		36		11163	00-Jan-00									xls96	HP	511
bayouwq	BUV9605	21-Mar-96	31616		370		11345	00-Jan-00									xls96	HP	524
bayouwq	BUA9606	21-Mar-96	31616		1100	QC	11351	00-Jan-00							QC		xls96	HP	509
bayouwq	BUP9604	21-Mar-96	31616		3600		11353	00-Jan-00									xls96	HP	520
bayouwq	BUO9604	21-Mar-96	31616		8600		11354	00-Jan-00									xls96	HP	519
bayouwq	BUM9604	21-Mar-96	31616		460		11357	00-Jan-00									xls96	HP	518
bayouwq	BUK9604	21-Mar-96	31616		2700		11359	00-Jan-00									xls96	HP	516
bayouwq	BUJ9604	21-Mar-96	31616		220000		11360	00-Jan-00									xls96	HP	515
bayouwq	BUI9604	21-Mar-96	31616		8500		11361	00-Jan-00									xls96	HP	527
bayouwq	BUH9604	21-Mar-96	31616		43000		11362	00-Jan-00									xls96	HP	514
bayouwq	BUF9603	21-Mar-96	31616		9		11363	00-Jan-00									xls96	HP	512
bayouwq	BUD9604	21-Mar-96	31616		9		11364	00-Jan-00									xls96	HP	510
bayouwq	BUX9604	21-Mar-96	31616		480		15840	00-Jan-00									xls96	HP	526
bayouwq	BUW9602	21-Mar-96	31616		880		15841	00-Jan-00									xls96	HP	525
bayouwq	BUS9604	21-Mar-96	31616		16000		15843	00-Jan-00									xls96	HP	523
bayouwq	BUQ9604	21-Mar-96	31616		3100		15844	00-Jan-00									xls96	HP	521
bayouwq	BUN9604	21-Mar-96	31616		250		15845	00-Jan-00									xls96	HP	528
bayouwq	BUL9604	21-Mar-96	31616		1000		15846	00-Jan-00									xls96	HP	517
bayouwq	BUG9602	21-Mar-96	31616		9		15847	00-Jan-00									xls96	HP	513
bayouwq	BUK9402	22-Mar-94	31616		110		11142	00-Jan-00									9495a	HP	545
bayouwq	BUV9402	22-Mar-94	31616		1300		11345	00-Jan-00									9495a	HP	579
bayouwq	BUA9404	22-Mar-94	31616		540		11351	00-Jan-00									9495a	HP	571
bayouwq	BUP9402	22-Mar-94	31616		220		11353	00-Jan-00									9495a	HP	567
bayouwq	BUO9402	22-Mar-94	31616		280		11354	00-Jan-00									9495a	HP	565
bayouwq	BUM9402	22-Mar-94	31616		220		11357	00-Jan-00									9495a	HP	561
bayouwq	BUK9402	22-Mar-94	31616		270		11359	00-Jan-00									9495a	HP	557
bayouwq	BUJ9402	22-Mar-94	31616		290		11360	00-Jan-00									9495a	HP	555
bayouwq	BUH9402	22-Mar-94	31616		270		11362	00-Jan-00									9495a	HP	553
bayouwq	BUW9402	22-Mar-94	31616		2900		15841	00-Jan-00									9495a	HP	581
bayouwq	BUU9402	22-Mar-94	31616		1100		15842	00-Jan-00									9495a	HP	577
bayouwq	BUS9402	22-Mar-94	31616		380		15843	00-Jan-00									9495a	HP	573
bayouwq	BUQ9402	22-Mar-94	31616		520		15844	00-Jan-00									9495a	HP	569
bayouwq	BUN9402	22-Mar-94	31616		290		15845	00-Jan-00									9495a	HP	563
bayouwq	BUL9402	22-Mar-94	31616		120		15846	00-Jan-00									9495a	HP	559
bayouwq	BUA8302	23-Mar-83	31616		200000		11351	00-Jan-00									pothe1	HP	8928

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUO8301	23-Mar-83	31616		11000		11354	00-Jan-00									poth1	HP	8926
bayouwq	BUM8302	23-Mar-83	31616		3000		11357	00-Jan-00									poth1	HP	8923
bayouwq	BUK8301	23-Mar-83	31616		1		11359	00-Jan-00									poth1	HP	8921
bayouwq	BUJ8302	23-Mar-83	31616		1		11360	00-Jan-00									poth1	HP	8920
bayouwq	BUI8301	23-Mar-83	31616		2000		11361	00-Jan-00									poth1	HP	8919
bayouwq	BUH8302	23-Mar-83	31616		1		11362	00-Jan-00									poth1	HP	8918
bayouwq	BUQ8302	23-Mar-83	31616		2000		15844	00-Jan-00									poth1	HP	8927
bayouwq	BUB9103	25-Mar-91	31616		140		11142	00-Jan-00									pbayou	HP	1280
bayouwq	BUA9107	25-Mar-91	31616		5700		11351	00-Jan-00									pbayou	HP	1306
bayouwq	BUP9102	25-Mar-91	31616		6700		11353	00-Jan-00									pbayou	HP	1302
bayouwq	BUK9105	25-Mar-91	31616		930		11359	00-Jan-00									pbayou	HP	1292
bayouwq	BUJ9107	25-Mar-91	31616		9		11360	00-Jan-00									pbayou	HP	1290
bayouwq	BUH9107	25-Mar-91	31616		810		11362	00-Jan-00									pbayou	HP	1288
bayouwq	BUD9106	25-Mar-91	31616		72		11364	00-Jan-00									pbayou	HP	1282
bayouwq	BUW9107	25-Mar-91	31616		3100		15841	00-Jan-00									pbayou	HP	1314
bayouwq	BUS9107	25-Mar-91	31616		5500		15843	00-Jan-00									pbayou	HP	1308
bayouwq	BUQ9104	25-Mar-91	31616		5300		15844	00-Jan-00									pbayou	HP	1304
bayouwq	BUN9107	25-Mar-91	31616		5500		15845	00-Jan-00									pbayou	HP	1298
bayouwq	BUL9107	25-Mar-91	31616		750		15846	00-Jan-00									pbayou	HP	1294
bayouwq	BUB9011	27-Mar-90	31616		1200		11142	00-Jan-00									poth1	HP	11149
bayouwq	BUE9011	27-Mar-90	31616		550		11163	00-Jan-00									poth1	HP	11153
bayouwq	BUA9011	27-Mar-90	31616		26000		11351	00-Jan-00									poth1	HP	11173
bayouwq	BUO9011	27-Mar-90	31616		5500		11354	00-Jan-00									poth1	HP	11169
bayouwq	BUM9011	27-Mar-90	31616		18		11357	00-Jan-00									poth1	HP	11165
bayouwq	BUK9010	27-Mar-90	31616		760		11359	00-Jan-00									poth1	HP	11161
bayouwq	BUJ9010	27-Mar-90	31616		45		11360	00-Jan-00									poth1	HP	11159
bayouwq	BUH9011	27-Mar-90	31616		36		11362	00-Jan-00									poth1	HP	11157
bayouwq	BUD9011	27-Mar-90	31616		460		11364	00-Jan-00									poth1	HP	11151
bayouwq	BUX9011	27-Mar-90	31616		550		15840	00-Jan-00									poth1	HP	11185
bayouwq	BUW9011	27-Mar-90	31616		8000		15841	00-Jan-00									poth1	HP	11181
bayouwq	BUU9011	27-Mar-90	31616		66000		15842	00-Jan-00									poth1	HP	11179
bayouwq	BUS9011	27-Mar-90	31616		5500		15843	00-Jan-00									poth1	HP	11175
bayouwq	BUQ9011	27-Mar-90	31616		3000		15844	00-Jan-00									poth1	HP	11171
bayouwq	BUN9011	27-Mar-90	31616		690		15845	00-Jan-00									poth1	HP	11167
bayouwq	BUL9010	27-Mar-90	31616		370		15846	00-Jan-00									poth1	HP	11163
bayouwq	BUG9011	27-Mar-90	31616		340		15847	00-Jan-00									poth1	HP	11155
bayouwq	BUE9504	27-Mar-95	31616		800		11163	00-Jan-00									9495a	HP	3370
bayouwq	BUV9503	27-Mar-95	31616		1300		11345	00-Jan-00									9495a	HP	3402
bayouwq	BUA9506	27-Mar-95	31616		8800	BM	11351	00-Jan-00							BM		9495a	HP	3396
bayouwq	BUP9504	27-Mar-95	31616		2700		11353	00-Jan-00									9495a	HP	3392
bayouwq	BUM9503	27-Mar-95	31616		1200		11357	00-Jan-00									9495a	HP	3386
bayouwq	BUK9503	27-Mar-95	31616		1100		11359	00-Jan-00									9495a	HP	3382
bayouwq	BUJ9504	27-Mar-95	31616		420		11360	00-Jan-00									9495a	HP	3380
bayouwq	BUI9504	27-Mar-95	31616		540		11361	00-Jan-00									9495a	HP	3378
bayouwq	BUH9504	27-Mar-95	31616		350		11362	00-Jan-00									9495a	HP	3376
bayouwq	BUF9504	27-Mar-95	31616		440		11363	00-Jan-00									9495a	HP	3372
bayouwq	BUD9504	27-Mar-95	31616		230		11364	00-Jan-00									9495a	HP	3368
bayouwq	BUS9504	27-Mar-95	31616		3900		15843	00-Jan-00									9495a	HP	3398
bayouwq	BUN9504	27-Mar-95	31616		4100		15845	00-Jan-00									9495a	HP	3388
bayouwq	BUL9504	27-Mar-95	31616		950		15846	00-Jan-00									9495a	HP	3384
bayouwq	BUA8503	28-Mar-85	31616		4300		11351	00-Jan-00									poth1	HP	9374
bayouwq	BUM8503	28-Mar-85	31616		39000		11357	00-Jan-00									poth1	HP	9369
bayouwq	BUK8503	28-Mar-85	31616		930		11359	00-Jan-00									poth1	HP	9367
bayouwq	BUJ8503	28-Mar-85	31616		180		11360	00-Jan-00									poth1	HP	9366
bayouwq	BUH8503	28-Mar-85	31616		140		11362	00-Jan-00									poth1	HP	9364
bayouwq	BUX8503	28-Mar-85	31616		1240		15840	00-Jan-00									poth1	HP	9383
bayouwq	BUW8503	28-Mar-85	31616		13700		15841	00-Jan-00									poth1	HP	9380
bayouwq	BUU8503	28-Mar-85	31616		9300		15842	00-Jan-00									poth1	HP	9378

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUS8503	28-Mar-85	31616		7300		15843	00-Jan-00									poth1	HP	9377
bayouwq	BUL8502	28-Mar-85	31616		1640		15846	00-Jan-00									poth1	HP	9368
bayouwq	BUA9607	28-Mar-96	31616		2400	BM	11351	00-Jan-00								BM	xls96	HP	609
bayouwq	BUB9403	30-Mar-94	31616		400		11142	00-Jan-00									9495a	HP	610
bayouwq	BUE9403	30-Mar-94	31616		210		11163	00-Jan-00									9495a	HP	616
bayouwq	BUV9403	30-Mar-94	31616		66000		11345	00-Jan-00									9495a	HP	646
bayouwq	BUA9405	30-Mar-94	31616		5000		11351	00-Jan-00									9495a	HP	638
bayouwq	BUO9403	30-Mar-94	31616		930		11354	00-Jan-00									9495a	HP	632
bayouwq	BUM9403	30-Mar-94	31616		540		11357	00-Jan-00									9495a	HP	628
bayouwq	BUK9403	30-Mar-94	31616		310		11359	00-Jan-00									9495a	HP	624
bayouwq	BUJ9403	30-Mar-94	31616		340		11360	00-Jan-00									9495a	HP	622
bayouwq	BUH9403	30-Mar-94	31616		420		11362	00-Jan-00									9495a	HP	620
bayouwq	BUX9402	30-Mar-94	31616		200		15840	00-Jan-00									9495a	HP	650
bayouwq	BUW9403	30-Mar-94	31616		1400		15841	00-Jan-00									9495a	HP	648
bayouwq	BUU9403	30-Mar-94	31616		11000		15842	00-Jan-00									9495a	HP	644
bayouwq	BUS9403	30-Mar-94	31616		2900		15843	00-Jan-00									9495a	HP	640
bayouwq	BUQ9403	30-Mar-94	31616		5200		15844	00-Jan-00									9495a	HP	636
bayouwq	BUN9403	30-Mar-94	31616		1400		15845	00-Jan-00									9495a	HP	630
bayouwq	BUL9403	30-Mar-94	31616		350		15846	00-Jan-00									9495a	HP	626
bayouwq	BUE9104	02-Apr-91	31616		1000		11163	00-Jan-00									pbayou	HP	1717
bayouwq	BUA9108	02-Apr-91	31616		2700		11351	00-Jan-00									pbayou	HP	1739
bayouwq	BUP9103	02-Apr-91	31616		860		11353	00-Jan-00									pbayou	HP	1735
bayouwq	BUM9104	02-Apr-91	31616		4400		11357	00-Jan-00									pbayou	HP	1729
bayouwq	BUK9106	02-Apr-91	31616		130		11359	00-Jan-00									pbayou	HP	1725
bayouwq	BUJ9108	02-Apr-91	31616		300		11360	00-Jan-00									pbayou	HP	1723
bayouwq	BUH9108	02-Apr-91	31616		4000		11362	00-Jan-00									pbayou	HP	1721
bayouwq	BUD9107	02-Apr-91	31616		280		11364	00-Jan-00									pbayou	HP	1715
bayouwq	BUW9108	02-Apr-91	31616		5900		15841	00-Jan-00									pbayou	HP	1747
bayouwq	BUS9108	02-Apr-91	31616		7500		15843	00-Jan-00									pbayou	HP	1741
bayouwq	BUQ9105	02-Apr-91	31616		2700		15844	00-Jan-00									pbayou	HP	1737
bayouwq	BUN9108	02-Apr-91	31616		6000		15845	00-Jan-00									pbayou	HP	1731
bayouwq	BUL9108	02-Apr-91	31616		180		15846	00-Jan-00									pbayou	HP	1727
bayouwq	BUG9104	02-Apr-91	31616		210		15847	00-Jan-00									pbayou	HP	1719
bayouwq	BUB9502	03-Apr-95	31616		54		11142	00-Jan-00									9495a	HP	3626
bayouwq	BUE9505	03-Apr-95	31616		460		11163	00-Jan-00									9495a	HP	3632
bayouwq	BUA9507	03-Apr-95	31616		99	BM	11351	00-Jan-00								BM	9495a	HP	3654
bayouwq	BUP9505	03-Apr-95	31616		330		11353	00-Jan-00									9495a	HP	3650
bayouwq	BUO9503	03-Apr-95	31616		90		11354	00-Jan-00									9495a	HP	3648
bayouwq	BUM9504	03-Apr-95	31616		130		11357	00-Jan-00									9495a	HP	3646
bayouwq	BUK9504	03-Apr-95	31616		190		11359	00-Jan-00									9495a	HP	3642
bayouwq	BUJ9505	03-Apr-95	31616		230		11360	00-Jan-00									9495a	HP	3640
bayouwq	BUH9505	03-Apr-95	31616		240		11362	00-Jan-00									9495a	HP	3638
bayouwq	BUF9505	03-Apr-95	31616		120		11363	00-Jan-00									9495a	HP	3634
bayouwq	BUD9505	03-Apr-95	31616		2500		11364	00-Jan-00									9495a	HP	3630
bayouwq	BUW9504	03-Apr-95	31616		690		15841	00-Jan-00									9495a	HP	3662
bayouwq	BUS9505	03-Apr-95	31616		170		15843	00-Jan-00									9495a	HP	3656
bayouwq	BUL9505	03-Apr-95	31616		380		15846	00-Jan-00									9495a	HP	3644
bayouwq	BUG9503	03-Apr-95	31616		290		15847	00-Jan-00									9495a	HP	3636
bayouwq	BUB8904	04-Apr-89	31616		580		11142	00-Jan-00									poth1	HP	10111
bayouwq	BUA8904	04-Apr-89	31616		20000		11351	00-Jan-00									poth1	HP	10121
bayouwq	BUO8903	04-Apr-89	31616		2700		11354	00-Jan-00									poth1	HP	10119
bayouwq	BUM8904	04-Apr-89	31616		9		11357	00-Jan-00									poth1	HP	10117
bayouwq	BUJ8904	04-Apr-89	31616		18		11360	00-Jan-00									poth1	HP	10115
bayouwq	BUH8904	04-Apr-89	31616		950		11362	00-Jan-00									poth1	HP	10114
bayouwq	BUD8903	04-Apr-89	31616		410		11364	00-Jan-00									poth1	HP	10112
bayouwq	BUX8904	04-Apr-89	31616		4000		15840	00-Jan-00									poth1	HP	10126
bayouwq	BUW8902	04-Apr-89	31616		7500		15841	00-Jan-00									poth1	HP	10125
bayouwq	BUU8904	04-Apr-89	31616		1200		15842	00-Jan-00									poth1	HP	10124

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUS8904	04-Apr-89	31616		21000		15843	00-Jan-00									poth1	HP	10122
bayouwq	BUQ8902	04-Apr-89	31616		12000		15844	00-Jan-00									poth1	HP	10120
bayouwq	BUN8902	04-Apr-89	31616		3500		15845	00-Jan-00									poth1	HP	10118
bayouwq	BUL8904	04-Apr-89	31616		220		15846	00-Jan-00									poth1	HP	10116
bayouwq	BUG8904	04-Apr-89	31616		1300		15847	00-Jan-00									poth1	HP	10113
bayouwq	BUB9404	05-Apr-94	31616		210		11142	00-Jan-00									9495a	HP	283
bayouwq	BUE9404	05-Apr-94	31616		280		11163	00-Jan-00									9495a	HP	287
bayouwq	BUV9404	05-Apr-94	31616		200000		11345	00-Jan-00									9495a	HP	317
bayouwq	BUA9406	05-Apr-94	31616		330		11351	00-Jan-00									9495a	HP	309
bayouwq	BUP9404	05-Apr-94	31616		340		11353	00-Jan-00									9495a	HP	305
bayouwq	BUO9404	05-Apr-94	31616		410		11354	00-Jan-00									9495a	HP	303
bayouwq	BUM9404	05-Apr-94	31616		720		11357	00-Jan-00									9495a	HP	299
bayouwq	BUK9404	05-Apr-94	31616		9500		11359	00-Jan-00									9495a	HP	295
bayouwq	BUJ9404	05-Apr-94	31616		34000		11360	00-Jan-00									9495a	HP	293
bayouwq	BUH9404	05-Apr-94	31616		220		11362	00-Jan-00									9495a	HP	291
bayouwq	BUX9403	05-Apr-94	31616		1100		15840	00-Jan-00									9495a	HP	321
bayouwq	BUW9404	05-Apr-94	31616		4600		15841	00-Jan-00									9495a	HP	319
bayouwq	BUU9404	05-Apr-94	31616		33000		15842	00-Jan-00									9495a	HP	315
bayouwq	BUS9404	05-Apr-94	31616		440		15843	00-Jan-00									9495a	HP	311
bayouwq	BUQ9404	05-Apr-94	31616		290		15844	00-Jan-00									9495a	HP	307
bayouwq	BUN9404	05-Apr-94	31616		900		15845	00-Jan-00									9495a	HP	301
bayouwq	BUL9404	05-Apr-94	31616		4900		15846	00-Jan-00									9495a	HP	297
bayouwq	BUG9404	05-Apr-94	31616		220		15847	00-Jan-00									9495a	HP	289
bayouwq	BUV8403	06-Apr-84	31616		35000		11345	00-Jan-00									poth1	HP	9187
bayouwq	BUA8403	06-Apr-84	31616		95000		11351	00-Jan-00									poth1	HP	9182
bayouwq	BUX8403	06-Apr-84	31616		2000		15840	00-Jan-00									poth1	HP	9191
bayouwq	BUU8402	06-Apr-84	31616		21000		15842	00-Jan-00									poth1	HP	9186
bayouwq	BUS8403	06-Apr-84	31616		30670		15843	00-Jan-00									poth1	HP	9185
bayouwq	BUQ8401	06-Apr-84	31616		250000		15844	00-Jan-00									poth1	HP	9181
bayouwq	BUA8702	06-Apr-87	31616		7900		11351	00-Jan-00									poth1	HP	9785
bayouwq	BUO8702	06-Apr-87	31616		11000		11354	00-Jan-00									poth1	HP	9784
bayouwq	BUM8702	06-Apr-87	31616		10		11357	00-Jan-00									poth1	HP	9783
bayouwq	BUJ8702	06-Apr-87	31616		10		11360	00-Jan-00									poth1	HP	9781
bayouwq	BUH8702	06-Apr-87	31616		3400		11362	00-Jan-00									poth1	HP	9780
bayouwq	BUD8702	06-Apr-87	31616		540		11364	00-Jan-00									poth1	HP	9778
bayouwq	BUX8702	06-Apr-87	31616		10		15840	00-Jan-00									poth1	HP	9789
bayouwq	BUW8702	06-Apr-87	31616		40000		15841	00-Jan-00									poth1	HP	9788
bayouwq	BUU8702	06-Apr-87	31616		9500		15842	00-Jan-00									poth1	HP	9787
bayouwq	BUS8702	06-Apr-87	31616		12000		15843	00-Jan-00									poth1	HP	9786
bayouwq	BUL8702	06-Apr-87	31616		60		15846	00-Jan-00									poth1	HP	9782
bayouwq	BUG8702	06-Apr-87	31616		1180		15847	00-Jan-00									poth1	HP	9779
bayouwq	BUE9605	08-Apr-96	31616		2700		11163	00-Jan-00									xls96	HP	680
bayouwq	BUV9606	08-Apr-96	31616		960		11345	00-Jan-00									xls96	HP	693
bayouwq	BUA9608	08-Apr-96	31616		20494	QC	11351	00-Jan-00							QC		xls96	HP	678
bayouwq	BUP9605	08-Apr-96	31616		900		11353	00-Jan-00									xls96	HP	688
bayouwq	BUO9605	08-Apr-96	31616		970		11354	00-Jan-00									xls96	HP	687
bayouwq	BUM9605	08-Apr-96	31616		850		11357	00-Jan-00									xls96	HP	686
bayouwq	BUK9605	08-Apr-96	31616		2200		11359	00-Jan-00									xls96	HP	684
bayouwq	BUI9605	08-Apr-96	31616		6300		11361	00-Jan-00									xls96	HP	696
bayouwq	BUH9605	08-Apr-96	31616		2300		11362	00-Jan-00									xls96	HP	683
bayouwq	BUF9604	08-Apr-96	31616		430		11363	00-Jan-00									xls96	HP	681
bayouwq	BUD9605	08-Apr-96	31616		340		11364	00-Jan-00									xls96	HP	679
bayouwq	BUX9605	08-Apr-96	31616		390		15840	00-Jan-00									xls96	HP	695
bayouwq	BUW9603	08-Apr-96	31616		2300		15841	00-Jan-00									xls96	HP	694
bayouwq	BUS9605	08-Apr-96	31616		2000		15843	00-Jan-00									xls96	HP	691
bayouwq	BUQ9605	08-Apr-96	31616		1100		15844	00-Jan-00									xls96	HP	689
bayouwq	BUN9605	08-Apr-96	31616		9100		15845	00-Jan-00									xls96	HP	697
bayouwq	BUL9605	08-Apr-96	31616		870		15846	00-Jan-00									xls96	HP	685

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUG9603	08-Apr-96	31616		240		15847	00-Jan-00									xls96	HP	682
bayouwq	BUB9104	09-Apr-91	31616		260		11142	00-Jan-00									pbayou	HP	1786
bayouwq	BUE9105	09-Apr-91	31616		590		11163	00-Jan-00									pbayou	HP	1790
bayouwq	BUA9109	09-Apr-91	31616		1100		11351	00-Jan-00									pbayou	HP	1812
bayouwq	BUP9104	09-Apr-91	31616		790		11353	00-Jan-00									pbayou	HP	1808
bayouwq	BUM9105	09-Apr-91	31616		510		11357	00-Jan-00									pbayou	HP	1802
bayouwq	BUK9107	09-Apr-91	31616		620		11359	00-Jan-00									pbayou	HP	1798
bayouwq	BUJ9109	09-Apr-91	31616		660		11360	00-Jan-00									pbayou	HP	1796
bayouwq	BUH9109	09-Apr-91	31616		700		11362	00-Jan-00									pbayou	HP	1794
bayouwq	BUD9108	09-Apr-91	31616		260		11364	00-Jan-00									pbayou	HP	1788
bayouwq	BUW9109	09-Apr-91	31616		15000		15841	00-Jan-00									pbayou	HP	1820
bayouwq	BUS9109	09-Apr-91	31616		2000		15843	00-Jan-00									pbayou	HP	1814
bayouwq	BUN9109	09-Apr-91	31616		800		15845	00-Jan-00									pbayou	HP	1804
bayouwq	BUL9109	09-Apr-91	31616		580		15846	00-Jan-00									pbayou	HP	1800
bayouwq	BUO8302	11-Apr-83	31616		5000		11354	00-Jan-00									pothel	HP	8957
bayouwq	BUM8303	11-Apr-83	31616		160000		11357	00-Jan-00									pothel	HP	8954
bayouwq	BUK8302	11-Apr-83	31616		1		11359	00-Jan-00									pothel	HP	8952
bayouwq	BUJ8303	11-Apr-83	31616		1		11360	00-Jan-00									pothel	HP	8951
bayouwq	BUI8302	11-Apr-83	31616		1		11361	00-Jan-00									pothel	HP	8950
bayouwq	BUH8303	11-Apr-83	31616		1		11362	00-Jan-00									pothel	HP	8949
bayouwq	BUN8302	11-Apr-83	31616		8000		15845	00-Jan-00									pothel	HP	8955
bayouwq	BUO8502	11-Apr-85	31616		30000		11354	00-Jan-00									pothel	HP	9404
bayouwq	BUM8504	11-Apr-85	31616		9600		11357	00-Jan-00									pothel	HP	9401
bayouwq	BUK8504	11-Apr-85	31616		70		11359	00-Jan-00									pothel	HP	9399
bayouwq	BUJ8504	11-Apr-85	31616		520		11360	00-Jan-00									pothel	HP	9398
bayouwq	BUH8504	11-Apr-85	31616		2700		11362	00-Jan-00									pothel	HP	9396
bayouwq	BUX8504	11-Apr-85	31616		1270		15840	00-Jan-00									pothel	HP	9415
bayouwq	BUW8504	11-Apr-85	31616		238000		15841	00-Jan-00									pothel	HP	9412
bayouwq	BUU8504	11-Apr-85	31616		25000		15842	00-Jan-00									pothel	HP	9410
bayouwq	BUS8504	11-Apr-85	31616		18700		15843	00-Jan-00									pothel	HP	9409
bayouwq	BUB9012	12-Apr-90	31616		350		11142	00-Jan-00									pothel	HP	11220
bayouwq	BUE9012	12-Apr-90	31616		1200		11163	00-Jan-00									pothel	HP	11224
bayouwq	BUA9012	12-Apr-90	31616		4400		11351	00-Jan-00									pothel	HP	11244
bayouwq	BUO9012	12-Apr-90	31616		2400		11354	00-Jan-00									pothel	HP	11240
bayouwq	BUM9012	12-Apr-90	31616		980		11357	00-Jan-00									pothel	HP	11236
bayouwq	BUK9011	12-Apr-90	31616		450		11359	00-Jan-00									pothel	HP	11232
bayouwq	BUJ9011	12-Apr-90	31616		620		11360	00-Jan-00									pothel	HP	11230
bayouwq	BUH9012	12-Apr-90	31616		810		11362	00-Jan-00									pothel	HP	11228
bayouwq	BUD9012	12-Apr-90	31616		260		11364	00-Jan-00									pothel	HP	11222
bayouwq	BUW9012	12-Apr-90	31616		4100		15841	00-Jan-00									pothel	HP	11252
bayouwq	BUU9012	12-Apr-90	31616		16000		15842	00-Jan-00									pothel	HP	11250
bayouwq	BUS9012	12-Apr-90	31616		3200		15843	00-Jan-00									pothel	HP	11246
bayouwq	BUQ9012	12-Apr-90	31616		4000		15844	00-Jan-00									pothel	HP	11242
bayouwq	BUN9012	12-Apr-90	31616		2200		15845	00-Jan-00									pothel	HP	11238
bayouwq	BUL9011	12-Apr-90	31616		590		15846	00-Jan-00									pothel	HP	11234
bayouwq	BUG9012	12-Apr-90	31616		3000		15847	00-Jan-00									pothel	HP	11226
bayouwq	BUE9201	13-Apr-92	31616		3400		11163	00-Jan-00									pbayou	HP	2294
bayouwq	BUV9201	13-Apr-92	31616		3500		11345	00-Jan-00									pbayou	HP	2324
bayouwq	BUA9201	13-Apr-92	31616		280		11351	00-Jan-00									pbayou	HP	2316
bayouwq	BUP9201	13-Apr-92	31616		440		11353	00-Jan-00									pbayou	HP	2312
bayouwq	BUO9201	13-Apr-92	31616		400		11354	00-Jan-00									pbayou	HP	2310
bayouwq	BUM9201	13-Apr-92	31616		450		11357	00-Jan-00									pbayou	HP	2306
bayouwq	BUK9201	13-Apr-92	31616		810		11359	00-Jan-00									pbayou	HP	2302
bayouwq	BUJ9201	13-Apr-92	31616		26000		11360	00-Jan-00									pbayou	HP	2300
bayouwq	BUH9201	13-Apr-92	31616		200		11362	00-Jan-00									pbayou	HP	2298
bayouwq	BUD9201	13-Apr-92	31616		200		11364	00-Jan-00									pbayou	HP	2292
bayouwq	BUW9201	13-Apr-92	31616		48000		15841	00-Jan-00									pbayou	HP	2326
bayouwq	BUU9201	13-Apr-92	31616		8600		15842	00-Jan-00									pbayou	HP	2322

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUS9201	13-Apr-92	31616		21000		15843	00-Jan-00									pbayou	HP	2318
bayouwq	BUN9201	13-Apr-92	31616		550		15845	00-Jan-00									pbayou	HP	2308
bayouwq	BUL9201	13-Apr-92	31616		970		15846	00-Jan-00									pbayou	HP	2304
bayouwq	BUB9301	13-Apr-93	31616		63		11142	00-Jan-00									pbayou	HP	2799
bayouwq	BUE9301	13-Apr-93	31616		190		11163	00-Jan-00									pbayou	HP	2803
bayouwq	BUV9301	13-Apr-93	31616		23000		11345	00-Jan-00									pbayou	HP	2831
bayouwq	BUA9301	13-Apr-93	31616		790		11351	00-Jan-00									pbayou	HP	2825
bayouwq	BUP9301	13-Apr-93	31616		880		11353	00-Jan-00									pbayou	HP	2821
bayouwq	BUO9301	13-Apr-93	31616		770		11354	00-Jan-00									pbayou	HP	2819
bayouwq	BUM9301	13-Apr-93	31616		710		11357	00-Jan-00									pbayou	HP	2815
bayouwq	BUK9301	13-Apr-93	31616		210		11359	00-Jan-00									pbayou	HP	2811
bayouwq	BUJ9301	13-Apr-93	31616		110		11360	00-Jan-00									pbayou	HP	2809
bayouwq	BUH9301	13-Apr-93	31616		260		11362	00-Jan-00									pbayou	HP	2807
bayouwq	BUD9301	13-Apr-93	31616		27		11364	00-Jan-00									pbayou	HP	2801
bayouwq	BUX9301	13-Apr-93	31616		7400		15840	00-Jan-00									pbayou	HP	2835
bayouwq	BUW9301	13-Apr-93	31616		28000		15841	00-Jan-00									pbayou	HP	2833
bayouwq	BUU9301	13-Apr-93	31616		20000		15842	00-Jan-00									pbayou	HP	2829
bayouwq	BUS9301	13-Apr-93	31616		1000		15843	00-Jan-00									pbayou	HP	2827
bayouwq	BUQ9301	13-Apr-93	31616		710		15844	00-Jan-00									pbayou	HP	2823
bayouwq	BUN9301	13-Apr-93	31616		560		15845	00-Jan-00									pbayou	HP	2817
bayouwq	BUL9301	13-Apr-93	31616		230		15846	00-Jan-00									pbayou	HP	2813
bayouwq	BUG9301	13-Apr-93	31616		300		15847	00-Jan-00									pbayou	HP	2805
bayouwq	BUB9405	19-Apr-94	31616		480		11142	00-Jan-00									9495a	HP	348
bayouwq	BUC9404	19-Apr-94	31616		560		11142	00-Jan-00									9495a	HP	350
bayouwq	BUE9405	19-Apr-94	31616		420		11163	00-Jan-00									9495a	HP	354
bayouwq	BUV9405	19-Apr-94	31616		4400		11345	00-Jan-00									9495a	HP	382
bayouwq	BUA9407	19-Apr-94	31616		2100		11351	00-Jan-00									9495a	HP	374
bayouwq	BUP9405	19-Apr-94	31616		2300		11353	00-Jan-00									9495a	HP	372
bayouwq	BUO9405	19-Apr-94	31616		3600		11354	00-Jan-00									9495a	HP	370
bayouwq	BUM9405	19-Apr-94	31616		2400		11357	00-Jan-00									9495a	HP	366
bayouwq	BUK9405	19-Apr-94	31616		6000		11359	00-Jan-00									9495a	HP	362
bayouwq	BUJ9405	19-Apr-94	31616		3100		11360	00-Jan-00									9495a	HP	360
bayouwq	BUH9405	19-Apr-94	31616		2300		11362	00-Jan-00									9495a	HP	358
bayouwq	BUD9405	19-Apr-94	31616		3500		11364	00-Jan-00									9495a	HP	352
bayouwq	BUW9405	19-Apr-94	31616		7500		15841	00-Jan-00									9495a	HP	384
bayouwq	BUU9405	19-Apr-94	31616		2900		15842	00-Jan-00									9495a	HP	380
bayouwq	BUS9405	19-Apr-94	31616		3700		15843	00-Jan-00									9495a	HP	376
bayouwq	BUN9405	19-Apr-94	31616		2400		15845	00-Jan-00									9495a	HP	368
bayouwq	BUL9405	19-Apr-94	31616		3800		15846	00-Jan-00									9495a	HP	364
bayouwq	BUG9405	19-Apr-94	31616		350		15847	00-Jan-00									9495a	HP	356
bayouwq	BUA9013	23-Apr-90	31616		13000		11351	00-Jan-00									pothel	HP	11315
bayouwq	BUO9013	23-Apr-90	31616		42000		11354	00-Jan-00									pothel	HP	11311
bayouwq	BUM9013	23-Apr-90	31616		730		11357	00-Jan-00									pothel	HP	11307
bayouwq	BUN9013	23-Apr-90	31616		19000		15845	00-Jan-00									pothel	HP	11309
bayouwq	BUV9504	24-Apr-95	31616		4100		11345	00-Jan-00									9495a	HP	3910
bayouwq	BUA9609	24-Apr-96	31616		2300	BM	11351	00-Jan-00							BM		xls96	HP	887
bayouwq	BUB9406	26-Apr-94	31616		500		11142	00-Jan-00									9495a	HP	411
bayouwq	BUC9405	26-Apr-94	31616		590		11142	00-Jan-00									9495a	HP	413
bayouwq	BUE9406	26-Apr-94	31616		360		11163	00-Jan-00									9495a	HP	417
bayouwq	BUV9406	26-Apr-94	31616		930		11345	00-Jan-00									9495a	HP	447
bayouwq	BUA9408	26-Apr-94	31616		5900		11351	00-Jan-00									9495a	HP	439
bayouwq	BUP9406	26-Apr-94	31616		2100		11353	00-Jan-00									9495a	HP	437
bayouwq	BUO9406	26-Apr-94	31616		2100		11354	00-Jan-00									9495a	HP	435
bayouwq	BUM9406	26-Apr-94	31616		920		11357	00-Jan-00									9495a	HP	431
bayouwq	BUK9406	26-Apr-94	31616		960		11359	00-Jan-00									9495a	HP	427
bayouwq	BUJ9401	26-Apr-94	31616		1300		11361	00-Jan-00									9495a	HP	425
bayouwq	BUH9406	26-Apr-94	31616		5400		11362	00-Jan-00									9495a	HP	423
bayouwq	BUF9401	26-Apr-94	31616		330		11363	00-Jan-00									9495a	HP	419

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUD9406	26-Apr-94	31616		570		11364	00-Jan-00									9495a	HP	415
bayouwq	BUX9404	26-Apr-94	31616		410		15840	00-Jan-00									9495a	HP	451
bayouwq	BUW9406	26-Apr-94	31616		27000		15841	00-Jan-00									9495a	HP	449
bayouwq	BUU9406	26-Apr-94	31616		860		15842	00-Jan-00									9495a	HP	445
bayouwq	BUS9406	26-Apr-94	31616		930		15843	00-Jan-00									9495a	HP	441
bayouwq	BUN9406	26-Apr-94	31616		2200		15845	00-Jan-00									9495a	HP	433
bayouwq	BUL9406	26-Apr-94	31616		680		15846	00-Jan-00									9495a	HP	429
bayouwq	BUG9406	26-Apr-94	31616		4500		15847	00-Jan-00									9495a	HP	421
bayouwq	BUA9508	26-Apr-95	31616		340	BM	11351	00-Jan-00							BM		9495a	HP	3593
bayouwq	BUA8603	28-Apr-86	31616		5000		11351	00-Jan-00									pother1	HP	9630
bayouwq	BUO8603	28-Apr-86	31616		5800		11354	00-Jan-00									pother1	HP	9628
bayouwq	BUM8603	28-Apr-86	31616		20600		11357	00-Jan-00									pother1	HP	9625
bayouwq	BUJ8603	28-Apr-86	31616		10		11360	00-Jan-00									pother1	HP	9622
bayouwq	BUH8603	28-Apr-86	31616		500		11362	00-Jan-00									pother1	HP	9620
bayouwq	BUX8603	28-Apr-86	31616		4100		15840	00-Jan-00									pother1	HP	9639
bayouwq	BUW8603	28-Apr-86	31616		9200		15841	00-Jan-00									pother1	HP	9636
bayouwq	BUU8603	28-Apr-86	31616		85000		15842	00-Jan-00									pother1	HP	9634
bayouwq	BUS8603	28-Apr-86	31616		32000		15843	00-Jan-00									pother1	HP	9633
bayouwq	BUL8603	28-Apr-86	31616		90		15846	00-Jan-00									pother1	HP	9624
bayouwq	BUB9105	30-Apr-91	31616		27		11142	00-Jan-00									pbayou	HP	1859
bayouwq	BUJ9106	30-Apr-91	31616		36		11163	00-Jan-00									pbayou	HP	1863
bayouwq	BUA9110	30-Apr-91	31616		660		11351	00-Jan-00									pbayou	HP	1885
bayouwq	BUP9105	30-Apr-91	31616		420		11353	00-Jan-00									pbayou	HP	1881
bayouwq	BUO9107	30-Apr-91	31616		280		11354	00-Jan-00									pbayou	HP	1879
bayouwq	BUM9106	30-Apr-91	31616		240		11357	00-Jan-00									pbayou	HP	1875
bayouwq	BUK9108	30-Apr-91	31616		110		11359	00-Jan-00									pbayou	HP	1871
bayouwq	BUJ9110	30-Apr-91	31616		200		11360	00-Jan-00									pbayou	HP	1869
bayouwq	BUH9110	30-Apr-91	31616		45		11362	00-Jan-00									pbayou	HP	1867
bayouwq	BUD9109	30-Apr-91	31616		45		11364	00-Jan-00									pbayou	HP	1861
bayouwq	BUW9110	30-Apr-91	31616		2700		15841	00-Jan-00									pbayou	HP	1893
bayouwq	BUU9103	30-Apr-91	31616		970		15842	00-Jan-00									pbayou	HP	1891
bayouwq	BUS9110	30-Apr-91	31616		800		15843	00-Jan-00									pbayou	HP	1887
bayouwq	BUQ9106	30-Apr-91	31616		860		15844	00-Jan-00									pbayou	HP	1883
bayouwq	BUN9110	30-Apr-91	31616		220		15845	00-Jan-00									pbayou	HP	1877
bayouwq	BUL9110	30-Apr-91	31616		190		15846	00-Jan-00									pbayou	HP	1873
bayouwq	BUG9106	30-Apr-91	31616		350		15847	00-Jan-00									pbayou	HP	1865
bayouwq	BUA8905	01-May-89	31616		19000		11351	00-Jan-00									pother1	HP	10147
bayouwq	BUO8904	01-May-89	31616		3300		11354	00-Jan-00									pother1	HP	10145
bayouwq	BUM8905	01-May-89	31616		1400		11357	00-Jan-00									pother1	HP	10143
bayouwq	BUJ8905	01-May-89	31616		110		11360	00-Jan-00									pother1	HP	10141
bayouwq	BUH8905	01-May-89	31616		48000		11362	00-Jan-00									pother1	HP	10140
bayouwq	BUD8904	01-May-89	31616		2200		11364	00-Jan-00									pother1	HP	10138
bayouwq	BUX8905	01-May-89	31616		8700		15840	00-Jan-00									pother1	HP	10152
bayouwq	BUW8903	01-May-89	31616		9700		15841	00-Jan-00									pother1	HP	10151
bayouwq	BUU8905	01-May-89	31616		20000		15842	00-Jan-00									pother1	HP	10150
bayouwq	BUS8905	01-May-89	31616		23000		15843	00-Jan-00									pother1	HP	10148
bayouwq	BUQ8903	01-May-89	31616		15000		15844	00-Jan-00									pother1	HP	10146
bayouwq	BUN8903	01-May-89	31616		2800		15845	00-Jan-00									pother1	HP	10144
bayouwq	BUL8905	01-May-89	31616		600		15846	00-Jan-00									pother1	HP	10142
bayouwq	BUG8905	01-May-89	31616		2000		15847	00-Jan-00									pother1	HP	10139
bayouwq	BUC9501	01-May-95	31616		210		11142	00-Jan-00									9495a	HP	4094
bayouwq	BUJ9506	01-May-95	31616		150		11163	00-Jan-00									9495a	HP	4098
bayouwq	BUV9505	01-May-95	31616		810		11345	00-Jan-00									9495a	HP	4130
bayouwq	BUA9509	01-May-95	31616		630	BM	11351	00-Jan-00							BM		9495a	HP	4124
bayouwq	BUO9504	01-May-95	31616		370		11354	00-Jan-00									9495a	HP	4118
bayouwq	BUM9505	01-May-95	31616		330		11357	00-Jan-00									9495a	HP	4114
bayouwq	BUK9505	01-May-95	31616		530		11359	00-Jan-00									9495a	HP	4110
bayouwq	BUJ9506	01-May-95	31616		450		11360	00-Jan-00									9495a	HP	4108

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUI9505	01-May-95	31616		380		11361	00-Jan-00									9495a	HP	4106
bayouwq	BUH9506	01-May-95	31616		360		11362	00-Jan-00									9495a	HP	4104
bayouwq	BUF9506	01-May-95	31616		190		11363	00-Jan-00									9495a	HP	4100
bayouwq	BUD9506	01-May-95	31616		360		11364	00-Jan-00									9495a	HP	4096
bayouwq	BUW9505	01-May-95	31616		90		15841	00-Jan-00									9495a	HP	4132
bayouwq	BUS9506	01-May-95	31616		4200		15843	00-Jan-00									9495a	HP	4126
bayouwq	BUQ9503	01-May-95	31616		220		15844	00-Jan-00									9495a	HP	4122
bayouwq	BUN9505	01-May-95	31616		950		15845	00-Jan-00									9495a	HP	4116
bayouwq	BUL9506	01-May-95	31616		350		15846	00-Jan-00									9495a	HP	4112
bayouwq	BUV9506	02-May-95	31616		350		11345	00-Jan-00									9495a	HP	4590
bayouwq	BUE9202	04-May-92	31616		72		11163	00-Jan-00									pbayou	HP	3795
bayouwq	BUV9202	04-May-92	31616		390		11345	00-Jan-00									pbayou	HP	3825
bayouwq	BUA9202	04-May-92	31616		210		11351	00-Jan-00									pbayou	HP	3817
bayouwq	BUP9202	04-May-92	31616		600		11353	00-Jan-00									pbayou	HP	3813
bayouwq	BUO9202	04-May-92	31616		410		11354	00-Jan-00									pbayou	HP	3811
bayouwq	BUM9202	04-May-92	31616		500		11357	00-Jan-00									pbayou	HP	3807
bayouwq	BUK9202	04-May-92	31616		530		11359	00-Jan-00									pbayou	HP	3803
bayouwq	BUJ9202	04-May-92	31616		110		11360	00-Jan-00									pbayou	HP	3801
bayouwq	BUH9202	04-May-92	31616		99		11362	00-Jan-00									pbayou	HP	3799
bayouwq	BUD9202	04-May-92	31616		9		11364	00-Jan-00									pbayou	HP	3793
bayouwq	BUW9202	04-May-92	31616		490		15841	00-Jan-00									pbayou	HP	3827
bayouwq	BUU9202	04-May-92	31616		430		15842	00-Jan-00									pbayou	HP	3823
bayouwq	BUS9202	04-May-92	31616		540		15843	00-Jan-00									pbayou	HP	3819
bayouwq	BUQ9201	04-May-92	31616		330		15844	00-Jan-00									pbayou	HP	3815
bayouwq	BUN9202	04-May-92	31616		360		15845	00-Jan-00									pbayou	HP	3809
bayouwq	BUL9202	04-May-92	31616		600		15846	00-Jan-00									pbayou	HP	3805
bayouwq	BUG9201	04-May-92	31616		310		15847	00-Jan-00									pbayou	HP	3797
bayouwq	BUA9111	06-May-91	31616		210		11351	00-Jan-00									pbayou	HP	3232
bayouwq	BUP9106	06-May-91	31616		180		11353	00-Jan-00									pbayou	HP	3228
bayouwq	BUJ9111	06-May-91	31616		130		11360	00-Jan-00									pbayou	HP	3216
bayouwq	BUH9111	06-May-91	31616		200		11362	00-Jan-00									pbayou	HP	3214
bayouwq	BUD9110	06-May-91	31616		63		11364	00-Jan-00									pbayou	HP	3208
bayouwq	BUX9101	06-May-91	31616		930		15840	00-Jan-00									pbayou	HP	3244
bayouwq	BUW9111	06-May-91	31616		1600		15841	00-Jan-00									pbayou	HP	3240
bayouwq	BUU9104	06-May-91	31616		1100		15842	00-Jan-00									pbayou	HP	3238
bayouwq	BUS9111	06-May-91	31616		470		15843	00-Jan-00									pbayou	HP	3234
bayouwq	BUN9111	06-May-91	31616		170		15845	00-Jan-00									pbayou	HP	3224
bayouwq	BUE9606	06-May-96	31616		500		11163	00-Jan-00									xls96	HP	994
bayouwq	BUV9607	06-May-96	31616		600		11345	00-Jan-00									xls96	HP	1007
bayouwq	BUA9610	06-May-96	31616		305	QC	11351	00-Jan-00							QC		xls96	HP	992
bayouwq	BUP9606	06-May-96	31616		690		11353	00-Jan-00									xls96	HP	1003
bayouwq	BUO9606	06-May-96	31616		370		11354	00-Jan-00									xls96	HP	1002
bayouwq	BUM9606	06-May-96	31616		11000		11357	00-Jan-00									xls96	HP	1000
bayouwq	BUK9606	06-May-96	31616		3700		11359	00-Jan-00									xls96	HP	998
bayouwq	BUJ9606	06-May-96	31616		9100		11361	00-Jan-00									xls96	HP	997
bayouwq	BUH9606	06-May-96	31616		950		11362	00-Jan-00									xls96	HP	996
bayouwq	BUD9606	06-May-96	31616		500		11364	00-Jan-00									xls96	HP	993
bayouwq	BUX9606	06-May-96	31616		380		15840	00-Jan-00									xls96	HP	1009
bayouwq	BUW9604	06-May-96	31616		850		15841	00-Jan-00									xls96	HP	1008
bayouwq	BUS9606	06-May-96	31616		750		15843	00-Jan-00									xls96	HP	1006
bayouwq	BUQ9606	06-May-96	31616		590		15844	00-Jan-00									xls96	HP	1004
bayouwq	BUN9606	06-May-96	31616		340		15845	00-Jan-00									xls96	HP	1001
bayouwq	BUL9606	06-May-96	31616		2800		15846	00-Jan-00									xls96	HP	999
bayouwq	BUG9604	06-May-96	31616		580		15847	00-Jan-00									xls96	HP	995
bayouwq	BUB9013	10-May-90	31616		81		11142	00-Jan-00									pother1	HP	11362
bayouwq	BUE9013	10-May-90	31616		72		11163	00-Jan-00									pother1	HP	11366
bayouwq	BUA9014	10-May-90	31616		620		11351	00-Jan-00									pother1	HP	11386
bayouwq	BUO9014	10-May-90	31616		630		11354	00-Jan-00									pother1	HP	11382

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUK9012	10-May-90	31616		260		11359	00-Jan-00									pothe1	HP	11374
bayouwq	BUJ9012	10-May-90	31616		170		11360	00-Jan-00									pothe1	HP	11372
bayouwq	BUH9013	10-May-90	31616		160		11362	00-Jan-00									pothe1	HP	11370
bayouwq	BUD9013	10-May-90	31616		72		11364	00-Jan-00									pothe1	HP	11364
bayouwq	BUW9013	10-May-90	31616		860		15841	00-Jan-00									pothe1	HP	11394
bayouwq	BUU9013	10-May-90	31616		780		15842	00-Jan-00									pothe1	HP	11392
bayouwq	BUS9013	10-May-90	31616		960		15843	00-Jan-00									pothe1	HP	11388
bayouwq	BUQ9013	10-May-90	31616		580		15844	00-Jan-00									pothe1	HP	11384
bayouwq	BUL9012	10-May-90	31616		170		15846	00-Jan-00									pothe1	HP	11376
bayouwq	BUG9013	10-May-90	31616		320		15847	00-Jan-00									pothe1	HP	11368
bayouwq	BUB9407	11-May-94	31616		470		11142	00-Jan-00									9495a	HP	4160
bayouwq	BUC9406	11-May-94	31616		500		11142	00-Jan-00									9495a	HP	4162
bayouwq	BUE9407	11-May-94	31616		760		11163	00-Jan-00									9495a	HP	4166
bayouwq	BUV9407	11-May-94	31616		1300		11345	00-Jan-00									9495a	HP	4200
bayouwq	BUA9409	11-May-94	31616		680		11351	00-Jan-00									9495a	HP	4192
bayouwq	BUP9407	11-May-94	31616		590		11353	00-Jan-00									9495a	HP	4188
bayouwq	BUO9407	11-May-94	31616		1600		11354	00-Jan-00									9495a	HP	4186
bayouwq	BUM9407	11-May-94	31616		330		11357	00-Jan-00									9495a	HP	4182
bayouwq	BUK9407	11-May-94	31616		450		11359	00-Jan-00									9495a	HP	4178
bayouwq	BUJ9406	11-May-94	31616		550		11360	00-Jan-00									9495a	HP	4176
bayouwq	BUI9402	11-May-94	31616		630		11361	00-Jan-00									9495a	HP	4174
bayouwq	BUH9407	11-May-94	31616		1200		11362	00-Jan-00									9495a	HP	4172
bayouwq	BUF9402	11-May-94	31616		770		11363	00-Jan-00									9495a	HP	4168
bayouwq	BUX9405	11-May-94	31616		440		15840	00-Jan-00									9495a	HP	4202
bayouwq	BUU9407	11-May-94	31616		2100		15842	00-Jan-00									9495a	HP	4198
bayouwq	BUS9407	11-May-94	31616		3800		15843	00-Jan-00									9495a	HP	4194
bayouwq	BUQ9405	11-May-94	31616		540		15844	00-Jan-00									9495a	HP	4190
bayouwq	BUN9407	11-May-94	31616		2400		15845	00-Jan-00									9495a	HP	4184
bayouwq	BUL9407	11-May-94	31616		420		15846	00-Jan-00									9495a	HP	4180
bayouwq	BUG9407	11-May-94	31616		200		15847	00-Jan-00									9495a	HP	4170
bayouwq	BUV9302	12-May-93	31616		2600		11345	00-Jan-00									pbayou	HP	4637
bayouwq	BUE9302	13-May-93	31616		63		11163	00-Jan-00									pbayou	HP	4364
bayouwq	BUV9303	13-May-93	31616		1700		11345	00-Jan-00									pbayou	HP	4392
bayouwq	BUA9302	13-May-93	31616		370		11351	00-Jan-00									pbayou	HP	4386
bayouwq	BUP9302	13-May-93	31616		680		11353	00-Jan-00									pbayou	HP	4382
bayouwq	BUO9302	13-May-93	31616		890		11354	00-Jan-00									pbayou	HP	4380
bayouwq	BUK9302	13-May-93	31616		250		11359	00-Jan-00									pbayou	HP	4372
bayouwq	BUJ9302	13-May-93	31616		210		11360	00-Jan-00									pbayou	HP	4370
bayouwq	BUH9302	13-May-93	31616		200		11362	00-Jan-00									pbayou	HP	4368
bayouwq	BUD9302	13-May-93	31616		110		11364	00-Jan-00									pbayou	HP	4362
bayouwq	BUS9302	13-May-93	31616		560		15843	00-Jan-00									pbayou	HP	4388
bayouwq	BUN9302	13-May-93	31616		2600		15845	00-Jan-00									pbayou	HP	4378
bayouwq	BUG9302	13-May-93	31616		800		15847	00-Jan-00									pbayou	HP	4366
bayouwq	BUB9106	15-May-91	31616		36		11142	00-Jan-00									pbayou	HP	3279
bayouwq	BUC9101	15-May-91	31616		9		11142	00-Jan-00									pbayou	HP	3277
bayouwq	BUA9112	15-May-91	31616		81		11351	00-Jan-00									pbayou	HP	3305
bayouwq	BUP9107	15-May-91	31616		170		11353	00-Jan-00									pbayou	HP	3301
bayouwq	BUO9108	15-May-91	31616		110		11354	00-Jan-00									pbayou	HP	3299
bayouwq	BUK9109	15-May-91	31616		110		11359	00-Jan-00									pbayou	HP	3291
bayouwq	BUJ9112	15-May-91	31616		99		11360	00-Jan-00									pbayou	HP	3289
bayouwq	BUH9112	15-May-91	31616		54		11362	00-Jan-00									pbayou	HP	3287
bayouwq	BUD9111	15-May-91	31616		9		11364	00-Jan-00									pbayou	HP	3281
bayouwq	BUW9112	15-May-91	31616		450		15841	00-Jan-00									pbayou	HP	3313
bayouwq	BUS9112	15-May-91	31616		350		15843	00-Jan-00									pbayou	HP	3307
bayouwq	BUN9112	15-May-91	31616		130		15845	00-Jan-00									pbayou	HP	3297
bayouwq	BUL9112	15-May-91	31616		160		15846	00-Jan-00									pbayou	HP	3293
bayouwq	BUM8403	16-May-84	31616		20800		11357	00-Jan-00									pothe1	HP	9209
bayouwq	BUK8401	16-May-84	31616		1		11359	00-Jan-00									pothe1	HP	9207

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUJ8403	16-May-84	31616		1		11360	00-Jan-00									poth1	HP	9206
bayouwq	BUN8402	16-May-84	31616		23000		15845	00-Jan-00									poth1	HP	9211
bayouwq	BUB9408	17-May-94	31616		31000		11142	00-Jan-00									9495a	HP	4229
bayouwq	BUC9407	17-May-94	31616		800		11142	00-Jan-00									9495a	HP	4231
bayouwq	BUE9408	17-May-94	31616		2400		11163	00-Jan-00									9495a	HP	4235
bayouwq	BUV9408	17-May-94	31616		4500		11345	00-Jan-00									9495a	HP	4265
bayouwq	BUA9410	17-May-94	31616		11000		11351	00-Jan-00									9495a	HP	4259
bayouwq	BUP9408	17-May-94	31616		7000		11353	00-Jan-00									9495a	HP	4257
bayouwq	BUO9408	17-May-94	31616		5000		11354	00-Jan-00									9495a	HP	4255
bayouwq	BUM9408	17-May-94	31616		7500		11357	00-Jan-00									9495a	HP	4251
bayouwq	BUK9408	17-May-94	31616		6700		11359	00-Jan-00									9495a	HP	4247
bayouwq	BUJ9407	17-May-94	31616		5500		11360	00-Jan-00									9495a	HP	4245
bayouwq	BUI9403	17-May-94	31616		8800		11361	00-Jan-00									9495a	HP	4243
bayouwq	BUH9408	17-May-94	31616		6000		11362	00-Jan-00									9495a	HP	4241
bayouwq	BUF9403	17-May-94	31616		3200		11363	00-Jan-00									9495a	HP	4237
bayouwq	BUD9408	17-May-94	31616		1500		11364	00-Jan-00									9495a	HP	4233
bayouwq	BUX9406	17-May-94	31616		4700		15840	00-Jan-00									9495a	HP	4269
bayouwq	BUW9407	17-May-94	31616		6200		15841	00-Jan-00									9495a	HP	4267
bayouwq	BUS9408	17-May-94	31616		13000		15843	00-Jan-00									9495a	HP	4261
bayouwq	BUN9408	17-May-94	31616		8900		15845	00-Jan-00									9495a	HP	4253
bayouwq	BUL9408	17-May-94	31616		7600		15846	00-Jan-00									9495a	HP	4249
bayouwq	BUG9408	17-May-94	31616		5700		15847	00-Jan-00									9495a	HP	4239
bayouwq	BUE9607	20-May-96	31616		490		11163	00-Jan-00									xls96	HP	1198
bayouwq	BUV9608	20-May-96	31616		680		11345	00-Jan-00									xls96	HP	1212
bayouwq	BUA9611	20-May-96	31616		450	BM	11351	00-Jan-00							BM		xls96	HP	1209
bayouwq	BUP9607	20-May-96	31616		600		11353	00-Jan-00									xls96	HP	1207
bayouwq	BUO9607	20-May-96	31616		270		11354	00-Jan-00									xls96	HP	1206
bayouwq	BUK9607	20-May-96	31616		600		11359	00-Jan-00									xls96	HP	1203
bayouwq	BUI9607	20-May-96	31616		7600		11361	00-Jan-00									xls96	HP	1202
bayouwq	BUH9607	20-May-96	31616		840		11362	00-Jan-00									xls96	HP	1201
bayouwq	BUF9605	20-May-96	31616		520		11363	00-Jan-00									xls96	HP	1199
bayouwq	BUD9607	20-May-96	31616		460		11364	00-Jan-00									xls96	HP	1197
bayouwq	BUX9607	20-May-96	31616		425		15840	00-Jan-00									xls96	HP	1214
bayouwq	BUW9605	20-May-96	31616		730		15841	00-Jan-00									xls96	HP	1213
bayouwq	BUS9607	20-May-96	31616		730		15843	00-Jan-00									xls96	HP	1210
bayouwq	BUQ9607	20-May-96	31616		650		15844	00-Jan-00									xls96	HP	1208
bayouwq	BUN9607	20-May-96	31616		300		15845	00-Jan-00									xls96	HP	1205
bayouwq	BUL9607	20-May-96	31616		3600		15846	00-Jan-00									xls96	HP	1204
bayouwq	BUG9605	20-May-96	31616		830		15847	00-Jan-00									xls96	HP	1200
bayouwq	BUB9014	21-May-90	31616		91		11142	00-Jan-00									poth1	HP	11433
bayouwq	BUE9014	21-May-90	31616		1000		11163	00-Jan-00									poth1	HP	11437
bayouwq	BUA9015	21-May-90	31616		9100		11351	00-Jan-00									poth1	HP	11457
bayouwq	BUO9015	21-May-90	31616		1700		11354	00-Jan-00									poth1	HP	11453
bayouwq	BUM9014	21-May-90	31616		2300		11357	00-Jan-00									poth1	HP	11449
bayouwq	BUK9013	21-May-90	31616		1100		11359	00-Jan-00									poth1	HP	11445
bayouwq	BUJ9013	21-May-90	31616		1700		11360	00-Jan-00									poth1	HP	11443
bayouwq	BUH9014	21-May-90	31616		1400		11362	00-Jan-00									poth1	HP	11441
bayouwq	BUD9014	21-May-90	31616		360		11364	00-Jan-00									poth1	HP	11435
bayouwq	BUW9014	21-May-90	31616		5200		15841	00-Jan-00									poth1	HP	11465
bayouwq	BUU9014	21-May-90	31616		6200		15842	00-Jan-00									poth1	HP	11463
bayouwq	BUQ9014	21-May-90	31616		13000		15844	00-Jan-00									poth1	HP	11455
bayouwq	BUL9013	21-May-90	31616		3500		15846	00-Jan-00									poth1	HP	11447
bayouwq	BUG9014	21-May-90	31616		1200		15847	00-Jan-00									poth1	HP	11439
bayouwq	BUO8503	23-May-85	31616		2900		11354	00-Jan-00									poth1	HP	9436
bayouwq	BUM8505	23-May-85	31616		3500		11357	00-Jan-00									poth1	HP	9433
bayouwq	BUK8505	23-May-85	31616		1		11359	00-Jan-00									poth1	HP	9431
bayouwq	BUJ8505	23-May-85	31616		20		11360	00-Jan-00									poth1	HP	9430
bayouwq	BUH8505	23-May-85	31616		900		11362	00-Jan-00									poth1	HP	9428

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUX8505	23-May-85	31616		500		15840	00-Jan-00									pother1	HP	9447
bayouwq	BUW8505	23-May-85	31616		5200		15841	00-Jan-00									pother1	HP	9444
bayouwq	BUU8505	23-May-85	31616		17200		15842	00-Jan-00									pother1	HP	9442
bayouwq	BUS8505	23-May-85	31616		2500		15843	00-Jan-00									pother1	HP	9441
bayouwq	BUA9510	23-May-95	31616		400	BM	11351	00-Jan-00								BM	9495a	HP	3997
bayouwq	BUA9613	23-May-96	31616		2200	BM	11351	00-Jan-00								BM	xls96	HP	1238
bayouwq	BUV9409	24-May-94	31616		300		11345	00-Jan-00									9495a	HP	4333
bayouwq	BUA9411	24-May-94	31616		130		11351	00-Jan-00									9495a	HP	4327
bayouwq	BUP9409	24-May-94	31616		350		11353	00-Jan-00									9495a	HP	4325
bayouwq	BUO9409	24-May-94	31616		310		11354	00-Jan-00									9495a	HP	4323
bayouwq	BUK9409	24-May-94	31616		120		11359	00-Jan-00									9495a	HP	4315
bayouwq	BUJ9408	24-May-94	31616		130		11360	00-Jan-00									9495a	HP	4313
bayouwq	BUI9404	24-May-94	31616		140		11361	00-Jan-00									9495a	HP	4311
bayouwq	BUX9407	24-May-94	31616		140		15840	00-Jan-00									9495a	HP	4337
bayouwq	BUS9409	24-May-94	31616		200		15843	00-Jan-00									9495a	HP	4329
bayouwq	BUN9409	24-May-94	31616		150		15845	00-Jan-00									9495a	HP	4321
bayouwq	BUG9409	24-May-94	31616		340		15847	00-Jan-00									9495a	HP	4307
bayouwq	BUA9303	28-May-93	31616		34000	BM	11351	00-Jan-00								BM	pbayou	HP	4281
bayouwq	BUB9107	29-May-91	31616		54		11142	00-Jan-00									pbayou	HP	3352
bayouwq	BUC9102	29-May-91	31616		27		11142	00-Jan-00									pbayou	HP	3350
bayouwq	BUA9113	29-May-91	31616		560		11351	00-Jan-00									pbayou	HP	3378
bayouwq	BUP9108	29-May-91	31616		730		11353	00-Jan-00									pbayou	HP	3374
bayouwq	BUJ9113	29-May-91	31616		200		11360	00-Jan-00									pbayou	HP	3362
bayouwq	BUH9113	29-May-91	31616		54		11362	00-Jan-00									pbayou	HP	3360
bayouwq	BUD9112	29-May-91	31616		72		11364	00-Jan-00									pbayou	HP	3354
bayouwq	BUS9113	29-May-91	31616		3300		15843	00-Jan-00									pbayou	HP	3380
bayouwq	BUN9113	29-May-91	31616		680		15845	00-Jan-00									pbayou	HP	3370
bayouwq	BUL9113	29-May-91	31616		2400		15846	00-Jan-00									pbayou	HP	3366
bayouwq	BUB9015	30-May-90	31616		550		11142	00-Jan-00									pother1	HP	11504
bayouwq	BUK9015	30-May-90	31616		580		11163	00-Jan-00									pother1	HP	11508
bayouwq	BUA9016	30-May-90	31616		9400		11351	00-Jan-00									pother1	HP	11528
bayouwq	BUO9016	30-May-90	31616		9400		11354	00-Jan-00									pother1	HP	11524
bayouwq	BUM9015	30-May-90	31616		1600		11357	00-Jan-00									pother1	HP	11520
bayouwq	BUK9014	30-May-90	31616		5700		11359	00-Jan-00									pother1	HP	11516
bayouwq	BUJ9014	30-May-90	31616		950		11360	00-Jan-00									pother1	HP	11514
bayouwq	BUH9015	30-May-90	31616		4400		11362	00-Jan-00									pother1	HP	11512
bayouwq	BUD9015	30-May-90	31616		820		11364	00-Jan-00									pother1	HP	11506
bayouwq	BUW9015	30-May-90	31616		3300		15841	00-Jan-00									pother1	HP	11536
bayouwq	BUU9015	30-May-90	31616		6400		15842	00-Jan-00									pother1	HP	11534
bayouwq	BUS9015	30-May-90	31616		6300		15843	00-Jan-00									pother1	HP	11530
bayouwq	BUQ9015	30-May-90	31616		7700		15844	00-Jan-00									pother1	HP	11526
bayouwq	BUN9016	30-May-90	31616		11000		15845	00-Jan-00									pother1	HP	11522
bayouwq	BUL9014	30-May-90	31616		530		15846	00-Jan-00									pother1	HP	11518
bayouwq	BUG9015	30-May-90	31616		3400		15847	00-Jan-00									pother1	HP	11510
bayouwq	BUB8802	01-Jun-88	31616		450		11142	00-Jan-00									pother1	HP	9868
bayouwq	BUA8802	01-Jun-88	31616		6600		11351	00-Jan-00									pother1	HP	9876
bayouwq	BUO8802	01-Jun-88	31616		4700		11354	00-Jan-00									pother1	HP	9875
bayouwq	BUM8802	01-Jun-88	31616		10		11357	00-Jan-00									pother1	HP	9874
bayouwq	BUJ8802	01-Jun-88	31616		10		11360	00-Jan-00									pother1	HP	9872
bayouwq	BUH8802	01-Jun-88	31616		5200		11362	00-Jan-00									pother1	HP	9871
bayouwq	BUD8802	01-Jun-88	31616		360		11364	00-Jan-00									pother1	HP	9869
bayouwq	BUX8802	01-Jun-88	31616		990		15840	00-Jan-00									pother1	HP	9880
bayouwq	BUW8802	01-Jun-88	31616		4300		15841	00-Jan-00									pother1	HP	9879
bayouwq	BUU8802	01-Jun-88	31616		43000		15842	00-Jan-00									pother1	HP	9878
bayouwq	BUS8802	01-Jun-88	31616		5000		15843	00-Jan-00									pother1	HP	9877
bayouwq	BUL8802	01-Jun-88	31616		10		15846	00-Jan-00									pother1	HP	9873
bayouwq	BUG8802	01-Jun-88	31616		17000		15847	00-Jan-00									pother1	HP	9870
bayouwq	BUA9304	03-Jun-93	31616		1000	BM	11351	00-Jan-00								BM	pbayou	HP	5763

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUB9016	04-Jun-90	31616		1100		11142	00-Jan-00									poth1	HP	11575
bayouwq	BUE9016	04-Jun-90	31616		11000		11163	00-Jan-00									poth1	HP	11579
bayouwq	BUA9017	04-Jun-90	31616		1200		11351	00-Jan-00									poth1	HP	11599
bayouwq	BUM9016	04-Jun-90	31616		740		11357	00-Jan-00									poth1	HP	11591
bayouwq	BUK9015	04-Jun-90	31616		18		11359	00-Jan-00									poth1	HP	11587
bayouwq	BUJ9015	04-Jun-90	31616		9		11360	00-Jan-00									poth1	HP	11585
bayouwq	BUH9016	04-Jun-90	31616		1300		11362	00-Jan-00									poth1	HP	11583
bayouwq	BUD9016	04-Jun-90	31616		530		11364	00-Jan-00									poth1	HP	11577
bayouwq	BUW9016	04-Jun-90	31616		1500		15841	00-Jan-00									poth1	HP	11607
bayouwq	BUU9016	04-Jun-90	31616		50000		15842	00-Jan-00									poth1	HP	11605
bayouwq	BUS9016	04-Jun-90	31616		6000		15843	00-Jan-00									poth1	HP	11601
bayouwq	BUQ9016	04-Jun-90	31616		5900		15844	00-Jan-00									poth1	HP	11597
bayouwq	BUN9017	04-Jun-90	31616		2800		15845	00-Jan-00									poth1	HP	11593
bayouwq	BUL9015	04-Jun-90	31616		45		15846	00-Jan-00									poth1	HP	11589
bayouwq	BUG9016	04-Jun-90	31616		140		15847	00-Jan-00									poth1	HP	11581
bayouwq	BUB9503	05-Jun-95	31616		200		11142	00-Jan-00									9495a	HP	4906
bayouwq	BUC9502	05-Jun-95	31616		940		11142	00-Jan-00									9495b	HP	12
bayouwq	BUE9507	05-Jun-95	31616		260		11163	00-Jan-00									9495b	HP	14
bayouwq	BUV9507	05-Jun-95	31616		8500		11345	00-Jan-00									9495b	HP	29
bayouwq	BUA9511	05-Jun-95	31616		200	QC	11351	00-Jan-00							QC		9495a	HP	4904
bayouwq	BUP9506	05-Jun-95	31616		3200		11353	00-Jan-00									9495b	HP	23
bayouwq	BUO9505	05-Jun-95	31616		1600		11354	00-Jan-00									9495a	HP	4932
bayouwq	BUM9506	05-Jun-95	31616		11000		11357	00-Jan-00									9495a	HP	4928
bayouwq	BUK9506	05-Jun-95	31616		1000		11359	00-Jan-00									9495b	HP	19
bayouwq	BUJ9507	05-Jun-95	31616		950		11360	00-Jan-00									9495b	HP	18
bayouwq	BUI9506	05-Jun-95	31616		5500		11361	00-Jan-00									9495b	HP	32
bayouwq	BUH9507	05-Jun-95	31616		550		11362	00-Jan-00									9495b	HP	17
bayouwq	BUF9507	05-Jun-95	31616		420		11363	00-Jan-00									9495b	HP	15
bayouwq	BUD9507	05-Jun-95	31616		140		11364	00-Jan-00									9495a	HP	4910
bayouwq	BUX9502	05-Jun-95	31616		5700		15840	00-Jan-00									9495b	HP	31
bayouwq	BUW9506	05-Jun-95	31616		3800		15841	00-Jan-00									9495b	HP	30
bayouwq	BUU9501	05-Jun-95	31616		4900		15842	00-Jan-00									9495b	HP	27
bayouwq	BUS9507	05-Jun-95	31616		2200		15843	00-Jan-00									9495b	HP	26
bayouwq	BUQ9504	05-Jun-95	31616		1100		15844	00-Jan-00									9495a	HP	4936
bayouwq	BUN9506	05-Jun-95	31616		2100		15845	00-Jan-00									9495b	HP	22
bayouwq	BUL9507	05-Jun-95	31616		1200		15846	00-Jan-00									9495b	HP	20
bayouwq	BUG9504	05-Jun-95	31616		380		15847	00-Jan-00									9495b	HP	16
bayouwq	BUB9602	05-Jun-96	31616		330		11142	00-Jan-00									bayou95	HP	9
bayouwq	BUC9601	05-Jun-96	31616		940		11142	00-Jan-00									bayou95	HP	10
bayouwq	BUE9608	05-Jun-96	31616		260		11163	00-Jan-00									bayou95	HP	12
bayouwq	BUV9609	05-Jun-96	31616		8500		11345	00-Jan-00									bayou95	HP	27
bayouwq	BUA9614	05-Jun-96	31616		4200	BM	11351	00-Jan-00							BM		bayou95	HP	23
bayouwq	BUP9608	05-Jun-96	31616		3200		11353	00-Jan-00									bayou95	HP	21
bayouwq	BUO9608	05-Jun-96	31616		1600		11354	00-Jan-00									bayou95	HP	31
bayouwq	BUM9607	05-Jun-96	31616		1300		11357	00-Jan-00									bayou95	HP	19
bayouwq	BUK9608	05-Jun-96	31616		1000		11359	00-Jan-00									bayou95	HP	17
bayouwq	BUJ9605	05-Jun-96	31616		950		11360	00-Jan-00									bayou95	HP	16
bayouwq	BUI9608	05-Jun-96	31616		5500		11361	00-Jan-00									bayou95	HP	30
bayouwq	BUH9608	05-Jun-96	31616		550		11362	00-Jan-00									bayou95	HP	15
bayouwq	BUF9606	05-Jun-96	31616		420		11363	00-Jan-00									bayou95	HP	13
bayouwq	BUD9608	05-Jun-96	31616		1000		11364	00-Jan-00									bayou95	HP	11
bayouwq	BUX9608	05-Jun-96	31616		5700		15840	00-Jan-00									bayou95	HP	29
bayouwq	BUW9606	05-Jun-96	31616		3800		15841	00-Jan-00									bayou95	HP	28
bayouwq	BUU9601	05-Jun-96	31616		4900		15842	00-Jan-00									bayou95	HP	25
bayouwq	BUS9608	05-Jun-96	31616		2200		15843	00-Jan-00									bayou95	HP	24
bayouwq	BUQ9608	05-Jun-96	31616		2400		15844	00-Jan-00									bayou95	HP	22
bayouwq	BUN9608	05-Jun-96	31616		2100		15845	00-Jan-00									bayou95	HP	20
bayouwq	BUL9608	05-Jun-96	31616		1200		15846	00-Jan-00									bayou95	HP	18

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUG9606	05-Jun-96	31616		380		15847	00-Jan-00									bayou95	HP	14
bayouwq	BUV9508	06-Jun-95	31616		6800		11345	00-Jan-00									9495a	HP	5295
bayouwq	BUB9410	07-Jun-94	31616		460		11142	00-Jan-00									9495a	HP	847
bayouwq	BUC9408	07-Jun-94	31616		480		11142	00-Jan-00									9495a	HP	849
bayouwq	BUE9410	07-Jun-94	31616		2300		11163	00-Jan-00									9495a	HP	853
bayouwq	BUV9410	07-Jun-94	31616		2100		11345	00-Jan-00									9495a	HP	883
bayouwq	BUA9412	07-Jun-94	31616		1600		11351	00-Jan-00									9495a	HP	875
bayouwq	BUP9410	07-Jun-94	31616		500		11353	00-Jan-00									9495a	HP	871
bayouwq	BUO9410	07-Jun-94	31616		640		11354	00-Jan-00									9495a	HP	869
bayouwq	BUM9410	07-Jun-94	31616		560		11357	00-Jan-00									9495a	HP	865
bayouwq	BUK9410	07-Jun-94	31616		2000		11359	00-Jan-00									9495a	HP	861
bayouwq	BUJ9409	07-Jun-94	31616		1300		11360	00-Jan-00									9495a	HP	859
bayouwq	BUI9405	07-Jun-94	31616		2100		11361	00-Jan-00									9495a	HP	857
bayouwq	BUH9410	07-Jun-94	31616		2600		11362	00-Jan-00									9495a	HP	855
bayouwq	BUD9410	07-Jun-94	31616		400		11364	00-Jan-00									9495a	HP	851
bayouwq	BUX9408	07-Jun-94	31616		4400		15840	00-Jan-00									9495a	HP	885
bayouwq	BUU9408	07-Jun-94	31616		2300		15842	00-Jan-00									9495a	HP	881
bayouwq	BUS9410	07-Jun-94	31616		1500		15843	00-Jan-00									9495a	HP	877
bayouwq	BUQ9406	07-Jun-94	31616		950		15844	00-Jan-00									9495a	HP	873
bayouwq	BUN9410	07-Jun-94	31616		610		15845	00-Jan-00									9495a	HP	867
bayouwq	BUL9410	07-Jun-94	31616		1000		15846	00-Jan-00									9495a	HP	863
bayouwq	BUV9304	09-Jun-93	31616		8100		11345	00-Jan-00									pbayou	HP	6310
bayouwq	BUA9305	09-Jun-93	31616		2600		11351	00-Jan-00									pbayou	HP	6302
bayouwq	BUA9306	10-Jun-93	31616		4100	BM	11351	00-Jan-00							BM		pbayou	HP	5810
bayouwq	BUE9609	10-Jun-96	31616		180		11163	00-Jan-00									xls96	HP	1338
bayouwq	BUV9610	10-Jun-96	31616		580		11345	00-Jan-00									xls96	HP	1354
bayouwq	BUA9615	10-Jun-96	31616		1200	QC	11351	00-Jan-00							QC		xls96	HP	1336
bayouwq	BUP9609	10-Jun-96	31616		670		11353	00-Jan-00									xls96	HP	1349
bayouwq	BUO9609	10-Jun-96	31616		520		11354	00-Jan-00									xls96	HP	1348
bayouwq	BUM9608	10-Jun-96	31616		3300		11357	00-Jan-00									xls96	HP	1346
bayouwq	BUK9609	10-Jun-96	31616		2100		11359	00-Jan-00									xls96	HP	1344
bayouwq	BUJ9606	10-Jun-96	31616		770		11360	00-Jan-00									xls96	HP	1343
bayouwq	BUI9609	10-Jun-96	31616		590		11361	00-Jan-00									xls96	HP	1342
bayouwq	BUH9609	10-Jun-96	31616		530		11362	00-Jan-00									xls96	HP	1341
bayouwq	BUF9607	10-Jun-96	31616		560		11363	00-Jan-00									xls96	HP	1339
bayouwq	BUD9609	10-Jun-96	31616		360		11364	00-Jan-00									xls96	HP	1337
bayouwq	BUX9609	10-Jun-96	31616		2700		15840	00-Jan-00									xls96	HP	1356
bayouwq	BUW9607	10-Jun-96	31616		890		15841	00-Jan-00									xls96	HP	1355
bayouwq	BUS9609	10-Jun-96	31616		2800		15843	00-Jan-00									xls96	HP	1352
bayouwq	BUQ9609	10-Jun-96	31616		590		15844	00-Jan-00									xls96	HP	1350
bayouwq	BUN9609	10-Jun-96	31616		650		15845	00-Jan-00									xls96	HP	1347
bayouwq	BUL9609	10-Jun-96	31616		1000		15846	00-Jan-00									xls96	HP	1345
bayouwq	BUG9607	10-Jun-96	31616		1000		15847	00-Jan-00									xls96	HP	1340
bayouwq	BUB9017	12-Jun-90	31616		6000		11142	00-Jan-00									pothor1	HP	11646
bayouwq	BUE9017	12-Jun-90	31616		310		11163	00-Jan-00									pothor1	HP	11650
bayouwq	BUM9017	12-Jun-90	31616		2700		11357	00-Jan-00									pothor1	HP	11662
bayouwq	BUK9016	12-Jun-90	31616		72		11359	00-Jan-00									pothor1	HP	11658
bayouwq	BUJ9016	12-Jun-90	31616		710		11360	00-Jan-00									pothor1	HP	11656
bayouwq	BUH9017	12-Jun-90	31616		3600		11362	00-Jan-00									pothor1	HP	11654
bayouwq	BUD9017	12-Jun-90	31616		5300		11364	00-Jan-00									pothor1	HP	11648
bayouwq	BUW9017	12-Jun-90	31616		40000		15841	00-Jan-00									pothor1	HP	11678
bayouwq	BUU9017	12-Jun-90	31616		130000		15842	00-Jan-00									pothor1	HP	11676
bayouwq	BUS9017	12-Jun-90	31616		15000		15843	00-Jan-00									pothor1	HP	11672
bayouwq	BUQ9017	12-Jun-90	31616		3200		15844	00-Jan-00									pothor1	HP	11668
bayouwq	BUN9018	12-Jun-90	31616		4000		15845	00-Jan-00									pothor1	HP	11664
bayouwq	BUL9016	12-Jun-90	31616		910		15846	00-Jan-00									pothor1	HP	11660
bayouwq	BUG9017	12-Jun-90	31616		4600		15847	00-Jan-00									pothor1	HP	11652
bayouwq	BUV8302	13-Jun-83	31616		38000		11345	00-Jan-00									pothor1	HP	8996

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUA8303	13-Jun-83	31616		2000		11351	00-Jan-00									pothe1	HP	8991
bayouwq	BUO8303	13-Jun-83	31616		1000		11354	00-Jan-00									pothe1	HP	8989
bayouwq	BUM8304	13-Jun-83	31616		3000		11357	00-Jan-00									pothe1	HP	8986
bayouwq	BUJ8304	13-Jun-83	31616		1		11360	00-Jan-00									pothe1	HP	8983
bayouwq	BUH8304	13-Jun-83	31616		1		11362	00-Jan-00									pothe1	HP	8981
bayouwq	BUX8302	13-Jun-83	31616		1		15840	00-Jan-00									pothe1	HP	9000
bayouwq	BUW8302	13-Jun-83	31616		9000		15841	00-Jan-00									pothe1	HP	8997
bayouwq	BUS8302	13-Jun-83	31616		32000		15843	00-Jan-00									pothe1	HP	8994
bayouwq	BUA8906	13-Jun-89	31616		560		11351	00-Jan-00									pothe1	HP	10172
bayouwq	BUO8905	13-Jun-89	31616		1100		11354	00-Jan-00									pothe1	HP	10170
bayouwq	BUM8906	13-Jun-89	31616		200		11357	00-Jan-00									pothe1	HP	10168
bayouwq	BUJ8906	13-Jun-89	31616		1400		11360	00-Jan-00									pothe1	HP	10166
bayouwq	BUH8906	13-Jun-89	31616		840		11362	00-Jan-00									pothe1	HP	10165
bayouwq	BUD8905	13-Jun-89	31616		1100		11364	00-Jan-00									pothe1	HP	10163
bayouwq	BUX8906	13-Jun-89	31616		320		15840	00-Jan-00									pothe1	HP	10177
bayouwq	BUW8904	13-Jun-89	31616		260		15841	00-Jan-00									pothe1	HP	10176
bayouwq	BUU8906	13-Jun-89	31616		340		15842	00-Jan-00									pothe1	HP	10175
bayouwq	BUS8906	13-Jun-89	31616		850		15843	00-Jan-00									pothe1	HP	10173
bayouwq	BUQ8904	13-Jun-89	31616		410		15844	00-Jan-00									pothe1	HP	10171
bayouwq	BUN8904	13-Jun-89	31616		2100		15845	00-Jan-00									pothe1	HP	10169
bayouwq	BUL8906	13-Jun-89	31616		200		15846	00-Jan-00									pothe1	HP	10167
bayouwq	BUG8906	13-Jun-89	31616		1900		15847	00-Jan-00									pothe1	HP	10164
bayouwq	BUA9114	13-Jun-91	31616		2100		11351	00-Jan-00									pbayou	HP	4787
bayouwq	BUP9109	13-Jun-91	31616		5100		11353	00-Jan-00									pbayou	HP	4783
bayouwq	BUO9109	13-Jun-91	31616		3400		11354	00-Jan-00									pbayou	HP	4781
bayouwq	BUM9107	13-Jun-91	31616		2800		11357	00-Jan-00									pbayou	HP	4777
bayouwq	BUK9110	13-Jun-91	31616		3400		11359	00-Jan-00									pbayou	HP	4773
bayouwq	BUJ9114	13-Jun-91	31616		1800		11360	00-Jan-00									pbayou	HP	4771
bayouwq	BUW9113	13-Jun-91	31616		7000		15841	00-Jan-00									pbayou	HP	4795
bayouwq	BUU9105	13-Jun-91	31616		9000		15842	00-Jan-00									pbayou	HP	4793
bayouwq	BUS9114	13-Jun-91	31616		5500		15843	00-Jan-00									pbayou	HP	4789
bayouwq	BUQ9107	13-Jun-91	31616		2800		15844	00-Jan-00									pbayou	HP	4785
bayouwq	BUN9114	13-Jun-91	31616		6500		15845	00-Jan-00									pbayou	HP	4779
bayouwq	BUL9114	13-Jun-91	31616		8500		15846	00-Jan-00									pbayou	HP	4775
bayouwq	BUA8703	15-Jun-87	31616		4800		11351	00-Jan-00									pothe1	HP	9807
bayouwq	BUO8703	15-Jun-87	31616		2600		11354	00-Jan-00									pothe1	HP	9806
bayouwq	BUM8703	15-Jun-87	31616		2400		11357	00-Jan-00									pothe1	HP	9805
bayouwq	BUJ8703	15-Jun-87	31616		510		11360	00-Jan-00									pothe1	HP	9803
bayouwq	BUH8703	15-Jun-87	31616		3400		11362	00-Jan-00									pothe1	HP	9802
bayouwq	BUD8703	15-Jun-87	31616		270		11364	00-Jan-00									pothe1	HP	9800
bayouwq	BUX8703	15-Jun-87	31616		480		15840	00-Jan-00									pothe1	HP	9811
bayouwq	BUW8703	15-Jun-87	31616		2300		15841	00-Jan-00									pothe1	HP	9810
bayouwq	BUU8703	15-Jun-87	31616		4600		15842	00-Jan-00									pothe1	HP	9809
bayouwq	BUS8703	15-Jun-87	31616		2100		15843	00-Jan-00									pothe1	HP	9808
bayouwq	BUL8703	15-Jun-87	31616		2600		15846	00-Jan-00									pothe1	HP	9804
bayouwq	BUG8703	15-Jun-87	31616		1400		15847	00-Jan-00									pothe1	HP	9801
bayouwq	BUV9305	15-Jun-93	31616		12000		11345	00-Jan-00									pbayou	HP	6022
bayouwq	BUA9307	15-Jun-93	31616		2500		11351	00-Jan-00									pbayou	HP	6016
bayouwq	BUP9303	15-Jun-93	31616		3700		11353	00-Jan-00									pbayou	HP	6012
bayouwq	BUO9303	15-Jun-93	31616		2400		11354	00-Jan-00									pbayou	HP	6010
bayouwq	BUJ9303	15-Jun-93	31616		540		11360	00-Jan-00									pbayou	HP	6000
bayouwq	BUD9303	15-Jun-93	31616		430		11364	00-Jan-00									pbayou	HP	5992
bayouwq	BUX9302	15-Jun-93	31616		590		15840	00-Jan-00									pbayou	HP	6026
bayouwq	BUW9302	15-Jun-93	31616		11000		15841	00-Jan-00									pbayou	HP	6024
bayouwq	BUS9303	15-Jun-93	31616		2600		15843	00-Jan-00									pbayou	HP	6018
bayouwq	BUN9303	15-Jun-93	31616		3900		15845	00-Jan-00									pbayou	HP	6008
bayouwq	BUL9302	15-Jun-93	31616		680		15846	00-Jan-00									pbayou	HP	6004
bayouwq	BUA9308	16-Jun-93	31616		2700	BM	11351	00-Jan-00								BM	pbayou	HP	5857

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUB9108	17-Jun-91	31616		6700		11142	00-Jan-00									pbayou	HP	4834
bayouwq	BUE9107	17-Jun-91	31616		5400		11163	00-Jan-00									pbayou	HP	4838
bayouwq	BUA9115	17-Jun-91	31616		22000		11351	00-Jan-00									pbayou	HP	4860
bayouwq	BUP9110	17-Jun-91	31616		23000		11353	00-Jan-00									pbayou	HP	4856
bayouwq	BUO9110	17-Jun-91	31616		29000		11354	00-Jan-00									pbayou	HP	4854
bayouwq	BUM9108	17-Jun-91	31616		7000		11357	00-Jan-00									pbayou	HP	4850
bayouwq	BUK9111	17-Jun-91	31616		9600		11359	00-Jan-00									pbayou	HP	4846
bayouwq	BUJ9115	17-Jun-91	31616		19000		11360	00-Jan-00									pbayou	HP	4844
bayouwq	BUH9114	17-Jun-91	31616		15000		11362	00-Jan-00									pbayou	HP	4842
bayouwq	BUD9113	17-Jun-91	31616		8000		11364	00-Jan-00									pbayou	HP	4836
bayouwq	BUW9114	17-Jun-91	31616		48000		15841	00-Jan-00									pbayou	HP	4868
bayouwq	BUU9106	17-Jun-91	31616		35000		15842	00-Jan-00									pbayou	HP	4866
bayouwq	BUS9115	17-Jun-91	31616		31000		15843	00-Jan-00									pbayou	HP	4862
bayouwq	BUQ9108	17-Jun-91	31616		20000		15844	00-Jan-00									pbayou	HP	4858
bayouwq	BUN9115	17-Jun-91	31616		25000		15845	00-Jan-00									pbayou	HP	4852
bayouwq	BUL9115	17-Jun-91	31616		15000		15846	00-Jan-00									pbayou	HP	4848
bayouwq	BUG9107	17-Jun-91	31616		7800		15847	00-Jan-00									pbayou	HP	4840
bayouwq	BUB9018	20-Jun-90	31616		48000		11142	00-Jan-00									pothorl	HP	11717
bayouwq	BUE9018	20-Jun-90	31616		18000		11163	00-Jan-00									pothorl	HP	11721
bayouwq	BUA9019	20-Jun-90	31616		2400		11351	00-Jan-00									pothorl	HP	11741
bayouwq	BUO9017	20-Jun-90	31616		2200		11354	00-Jan-00									pothorl	HP	11737
bayouwq	BUK9017	20-Jun-90	31616		2800		11359	00-Jan-00									pothorl	HP	11729
bayouwq	BUJ9017	20-Jun-90	31616		2300		11360	00-Jan-00									pothorl	HP	11727
bayouwq	BUH9018	20-Jun-90	31616		11000		11362	00-Jan-00									pothorl	HP	11725
bayouwq	BUD9018	20-Jun-90	31616		20000		11364	00-Jan-00									pothorl	HP	11719
bayouwq	BUX9012	20-Jun-90	31616		2700		15840	00-Jan-00									pothorl	HP	11753
bayouwq	BUW9018	20-Jun-90	31616		4600		15841	00-Jan-00									pothorl	HP	11749
bayouwq	BUU9018	20-Jun-90	31616		9700		15842	00-Jan-00									pothorl	HP	11747
bayouwq	BUS9018	20-Jun-90	31616		14000		15843	00-Jan-00									pothorl	HP	11743
bayouwq	BUQ9018	20-Jun-90	31616		15000		15844	00-Jan-00									pothorl	HP	11739
bayouwq	BUN9019	20-Jun-90	31616		3200		15845	00-Jan-00									pothorl	HP	11735
bayouwq	BUL9017	20-Jun-90	31616		8900		15846	00-Jan-00									pothorl	HP	11731
bayouwq	BUG9018	20-Jun-90	31616		18000		15847	00-Jan-00									pothorl	HP	11723
bayouwq	BUV9203	22-Jun-92	31616		71000		11345	00-Jan-00									pbayou	HP	5289
bayouwq	BUA9203	22-Jun-92	31616		4500		11351	00-Jan-00									pbayou	HP	5281
bayouwq	BUP9203	22-Jun-92	31616		2300		11353	00-Jan-00									pbayou	HP	5277
bayouwq	BUO9203	22-Jun-92	31616		1500		11354	00-Jan-00									pbayou	HP	5275
bayouwq	BUM9203	22-Jun-92	31616		15000		11357	00-Jan-00									pbayou	HP	5271
bayouwq	BUK9203	22-Jun-92	31616		19000		11359	00-Jan-00									pbayou	HP	5267
bayouwq	BUJ9203	22-Jun-92	31616		2400		11360	00-Jan-00									pbayou	HP	5265
bayouwq	BUH9203	22-Jun-92	31616		780		11362	00-Jan-00									pbayou	HP	5263
bayouwq	BUW9203	22-Jun-92	31616		22000		15841	00-Jan-00									pbayou	HP	5291
bayouwq	BUS9203	22-Jun-92	31616		4000		15843	00-Jan-00									pbayou	HP	5283
bayouwq	BUN9203	22-Jun-92	31616		9900		15845	00-Jan-00									pbayou	HP	5273
bayouwq	BUB9019	26-Jun-90	31616		2200		11142	00-Jan-00									pothorl	HP	11788
bayouwq	BUE9019	26-Jun-90	31616		100000		11163	00-Jan-00									pothorl	HP	11792
bayouwq	BUA9020	26-Jun-90	31616		150000		11351	00-Jan-00									pothorl	HP	11812
bayouwq	BUM9019	26-Jun-90	31616		53000		11357	00-Jan-00									pothorl	HP	11804
bayouwq	BUK9018	26-Jun-90	31616		51000		11359	00-Jan-00									pothorl	HP	11800
bayouwq	BUJ9018	26-Jun-90	31616		120000		11360	00-Jan-00									pothorl	HP	11798
bayouwq	BUH9019	26-Jun-90	31616		130000		11362	00-Jan-00									pothorl	HP	11796
bayouwq	BUD9019	26-Jun-90	31616		3400		11364	00-Jan-00									pothorl	HP	11790
bayouwq	BUX9013	26-Jun-90	31616		4600		15840	00-Jan-00									pothorl	HP	11824
bayouwq	BUW9019	26-Jun-90	31616		150000		15841	00-Jan-00									pothorl	HP	11820
bayouwq	BUU9019	26-Jun-90	31616		190000		15842	00-Jan-00									pothorl	HP	11818
bayouwq	BUS9019	26-Jun-90	31616		120000		15843	00-Jan-00									pothorl	HP	11814
bayouwq	BUQ9019	26-Jun-90	31616		140000		15844	00-Jan-00									pothorl	HP	11810
bayouwq	BUN9020	26-Jun-90	31616		88000		15845	00-Jan-00									pothorl	HP	11806

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUL9018	26-Jun-90	31616		84000		15846	00-Jan-00									poth1	HP	11802
bayouwq	BUG9019	26-Jun-90	31616		48000		15847	00-Jan-00									poth1	HP	11794
bayouwq	BUA9512	27-Jun-95	31616		3100	BM	11351	00-Jan-00								BM	9495a	HP	4675
bayouwq	BUB9411	28-Jun-94	31616		900		11142	00-Jan-00									9495a	HP	915
bayouwq	BUC9409	28-Jun-94	31616		1000		11142	00-Jan-00									9495a	HP	917
bayouwq	BUE9411	28-Jun-94	31616		490		11163	00-Jan-00									9495a	HP	921
bayouwq	BUV9411	28-Jun-94	31616		3900		11345	00-Jan-00									9495a	HP	955
bayouwq	BUA9413	28-Jun-94	31616		1000		11351	00-Jan-00									9495a	HP	947
bayouwq	BUP9411	28-Jun-94	31616		310		11353	00-Jan-00									9495a	HP	943
bayouwq	BUO9411	28-Jun-94	31616		420		11354	00-Jan-00									9495a	HP	941
bayouwq	BUM9411	28-Jun-94	31616		370		11357	00-Jan-00									9495a	HP	937
bayouwq	BUK9411	28-Jun-94	31616		440		11359	00-Jan-00									9495a	HP	933
bayouwq	BUJ9410	28-Jun-94	31616		530		11360	00-Jan-00									9495a	HP	931
bayouwq	BUI9406	28-Jun-94	31616		500		11361	00-Jan-00									9495a	HP	929
bayouwq	BUH9411	28-Jun-94	31616		490		11362	00-Jan-00									9495a	HP	927
bayouwq	BUF9406	28-Jun-94	31616		550		11363	00-Jan-00									9495a	HP	923
bayouwq	BUD9411	28-Jun-94	31616		1100		11364	00-Jan-00									9495a	HP	919
bayouwq	BUX9409	28-Jun-94	31616		1700		15840	00-Jan-00									9495a	HP	959
bayouwq	BUW9408	28-Jun-94	31616		4200		15841	00-Jan-00									9495a	HP	957
bayouwq	BUU9409	28-Jun-94	31616		3000		15842	00-Jan-00									9495a	HP	953
bayouwq	BS9411	28-Jun-94	31616		2700		15843	00-Jan-00									9495a	HP	949
bayouwq	BUQ9407	28-Jun-94	31616		480		15844	00-Jan-00									9495a	HP	945
bayouwq	BUN9411	28-Jun-94	31616		2700		15845	00-Jan-00									9495a	HP	939
bayouwq	BUL9411	28-Jun-94	31616		450		15846	00-Jan-00									9495a	HP	935
bayouwq	BUG9411	28-Jun-94	31616		750		15847	00-Jan-00									9495a	HP	925
bayouwq	BUA9309	29-Jun-93	31616		6800	BM	11351	00-Jan-00								BM	pbayou	HP	5905
bayouwq	BUB9109	01-Jul-91	31616		830		11142	00-Jan-00									pbayou	HP	6434
bayouwq	BUE9108	01-Jul-91	31616		130		11163	00-Jan-00									pbayou	HP	6438
bayouwq	BUA9116	01-Jul-91	31616		1100		11351	00-Jan-00									pbayou	HP	6460
bayouwq	BUP9111	01-Jul-91	31616		690		11353	00-Jan-00									pbayou	HP	6456
bayouwq	BUO9111	01-Jul-91	31616		540		11354	00-Jan-00									pbayou	HP	6454
bayouwq	BUM9109	01-Jul-91	31616		6700		11357	00-Jan-00									pbayou	HP	6450
bayouwq	BUK9112	01-Jul-91	31616		430		11359	00-Jan-00									pbayou	HP	6446
bayouwq	BUJ9116	01-Jul-91	31616		400		11360	00-Jan-00									pbayou	HP	6444
bayouwq	BUH9115	01-Jul-91	31616		290		11362	00-Jan-00									pbayou	HP	6442
bayouwq	BUD9114	01-Jul-91	31616		700		11364	00-Jan-00									pbayou	HP	6436
bayouwq	BUX9102	01-Jul-91	31616		1200		15840	00-Jan-00									pbayou	HP	6472
bayouwq	BUW9115	01-Jul-91	31616		9900		15841	00-Jan-00									pbayou	HP	6468
bayouwq	BUU9107	01-Jul-91	31616		1300		15842	00-Jan-00									pbayou	HP	6466
bayouwq	BUS9116	01-Jul-91	31616		1000		15843	00-Jan-00									pbayou	HP	6462
bayouwq	BUQ9109	01-Jul-91	31616		960		15844	00-Jan-00									pbayou	HP	6458
bayouwq	BUN9116	01-Jul-91	31616		660		15845	00-Jan-00									pbayou	HP	6452
bayouwq	BUL9116	01-Jul-91	31616		480		15846	00-Jan-00									pbayou	HP	6448
bayouwq	BUG9108	01-Jul-91	31616		900		15847	00-Jan-00									pbayou	HP	6440
bayouwq	BUB9020	02-Jul-90	31616		2300		11142	00-Jan-00									poth1	HP	11859
bayouwq	BUE9020	02-Jul-90	31616		1000		11163	00-Jan-00									poth1	HP	11863
bayouwq	BUA9021	02-Jul-90	31616		3500		11351	00-Jan-00									poth1	HP	11883
bayouwq	BUO9018	02-Jul-90	31616		8900		11354	00-Jan-00									poth1	HP	11879
bayouwq	BUM9020	02-Jul-90	31616		4500		11357	00-Jan-00									poth1	HP	11875
bayouwq	BUK9019	02-Jul-90	31616		27000		11359	00-Jan-00									poth1	HP	11871
bayouwq	BUJ9019	02-Jul-90	31616		25000		11360	00-Jan-00									poth1	HP	11869
bayouwq	BUH9020	02-Jul-90	31616		2300		11362	00-Jan-00									poth1	HP	11867
bayouwq	BUD9020	02-Jul-90	31616		1800		11364	00-Jan-00									poth1	HP	11861
bayouwq	BUX9014	02-Jul-90	31616		660		15840	00-Jan-00									poth1	HP	11895
bayouwq	BUW9020	02-Jul-90	31616		2300		15841	00-Jan-00									poth1	HP	11891
bayouwq	BUU9020	02-Jul-90	31616		17000		15842	00-Jan-00									poth1	HP	11889
bayouwq	BUS9020	02-Jul-90	31616		2100		15843	00-Jan-00									poth1	HP	11885
bayouwq	BUQ9020	02-Jul-90	31616		10000		15844	00-Jan-00									poth1	HP	11881

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUN9021	02-Jul-90	31616		19000		15845	00-Jan-00									pothe1	HP	11877
bayouwq	BUL9019	02-Jul-90	31616		100000		15846	00-Jan-00									pothe1	HP	11873
bayouwq	BUG9020	02-Jul-90	31616		3600		15847	00-Jan-00									pothe1	HP	11865
bayouwq	BUB9504	03-Jul-95	31616		200		11142	00-Jan-00									9495a	HP	5472
bayouwq	BUC9503	03-Jul-95	31616		290		11142	00-Jan-00									9495a	HP	5474
bayouwq	BUE9508	03-Jul-95	31616		270		11163	00-Jan-00									9495a	HP	5478
bayouwq	BUV9509	03-Jul-95	31616		6900		11345	00-Jan-00									9495a	HP	5512
bayouwq	BUA9513	03-Jul-95	31616		1300	BM	11351	00-Jan-00							BM		9495a	HP	5504
bayouwq	BUP9507	03-Jul-95	31616		1400		11353	00-Jan-00									9495a	HP	5500
bayouwq	BUO9506	03-Jul-95	31616		1600		11354	00-Jan-00									9495a	HP	5498
bayouwq	BUM9507	03-Jul-95	31616		11000		11357	00-Jan-00									9495a	HP	5494
bayouwq	BUK9507	03-Jul-95	31616		5000		11359	00-Jan-00									9495a	HP	5490
bayouwq	BUJ9508	03-Jul-95	31616		2400		11360	00-Jan-00									9495a	HP	5488
bayouwq	BUI9507	03-Jul-95	31616		6500		11361	00-Jan-00									9495a	HP	5486
bayouwq	BUH9508	03-Jul-95	31616		20000		11362	00-Jan-00									9495a	HP	5484
bayouwq	BUF9508	03-Jul-95	31616		1100		11363	00-Jan-00									9495a	HP	5480
bayouwq	BUD9508	03-Jul-95	31616		140		11364	00-Jan-00									9495a	HP	5476
bayouwq	BUX9503	03-Jul-95	31616		5000		15840	00-Jan-00									9495a	HP	5516
bayouwq	BUU9502	03-Jul-95	31616		9800		15842	00-Jan-00									9495a	HP	5508
bayouwq	BUS9508	03-Jul-95	31616		1100		15843	00-Jan-00									9495a	HP	5506
bayouwq	BUQ9505	03-Jul-95	31616		1100		15844	00-Jan-00									9495a	HP	5502
bayouwq	BUN9507	03-Jul-95	31616		4000		15845	00-Jan-00									9495a	HP	5496
bayouwq	BUL9508	03-Jul-95	31616		8000		15846	00-Jan-00									9495a	HP	5492
bayouwq	BUG9505	03-Jul-95	31616		270		15847	00-Jan-00									9495a	HP	5482
bayouwq	BUB9412	05-Jul-94	31616		560		11142	00-Jan-00									9495a	HP	1347
bayouwq	BUC9410	05-Jul-94	31616		490		11142	00-Jan-00									9495a	HP	1349
bayouwq	BUE9412	05-Jul-94	31616		460		11163	00-Jan-00									9495a	HP	1353
bayouwq	BUV9412	05-Jul-94	31616		3100		11345	00-Jan-00									9495a	HP	1387
bayouwq	BUA9414	05-Jul-94	31616		3000		11351	00-Jan-00									9495a	HP	1379
bayouwq	BUP9412	05-Jul-94	31616		590		11353	00-Jan-00									9495a	HP	1375
bayouwq	BUO9412	05-Jul-94	31616		560		11354	00-Jan-00									9495a	HP	1373
bayouwq	BUM9412	05-Jul-94	31616		350		11357	00-Jan-00									9495a	HP	1369
bayouwq	BUK9412	05-Jul-94	31616		440		11359	00-Jan-00									9495a	HP	1365
bayouwq	BUJ9411	05-Jul-94	31616		530		11360	00-Jan-00									9495a	HP	1363
bayouwq	BUI9407	05-Jul-94	31616		600		11361	00-Jan-00									9495a	HP	1361
bayouwq	BUH9412	05-Jul-94	31616		380		11362	00-Jan-00									9495a	HP	1359
bayouwq	BUF9407	05-Jul-94	31616		580		11363	00-Jan-00									9495a	HP	1355
bayouwq	BUD9412	05-Jul-94	31616		420		11364	00-Jan-00									9495a	HP	1351
bayouwq	BUW9409	05-Jul-94	31616		5400		15841	00-Jan-00									9495a	HP	1389
bayouwq	BUS9412	05-Jul-94	31616		83000		15843	00-Jan-00									9495a	HP	1381
bayouwq	BUN9412	05-Jul-94	31616		610		15845	00-Jan-00									9495a	HP	1371
bayouwq	BUL9412	05-Jul-94	31616		520		15846	00-Jan-00									9495a	HP	1367
bayouwq	BUG9412	05-Jul-94	31616		450		15847	00-Jan-00									9495a	HP	1357
bayouwq	BUV9510	05-Jul-95	31616		60000		11345	00-Jan-00									9495a	HP	5811
bayouwq	BUB9201	06-Jul-92	31616		3700		11142	00-Jan-00									pbayou	HP	7267
bayouwq	BUE9203	06-Jul-92	31616		730		11163	00-Jan-00									pbayou	HP	7271
bayouwq	BUV9204	06-Jul-92	31616		6000		11345	00-Jan-00									pbayou	HP	7301
bayouwq	BUA9204	06-Jul-92	31616		550		11351	00-Jan-00									pbayou	HP	7293
bayouwq	BUP9204	06-Jul-92	31616		1400		11353	00-Jan-00									pbayou	HP	7289
bayouwq	BUO9204	06-Jul-92	31616		3200		11354	00-Jan-00									pbayou	HP	7287
bayouwq	BUK9204	06-Jul-92	31616		3500		11359	00-Jan-00									pbayou	HP	7279
bayouwq	BUJ9204	06-Jul-92	31616		5000		11360	00-Jan-00									pbayou	HP	7277
bayouwq	BUH9204	06-Jul-92	31616		8200		11362	00-Jan-00									pbayou	HP	7275
bayouwq	BUD9203	06-Jul-92	31616		17000		11364	00-Jan-00									pbayou	HP	7269
bayouwq	BUW9204	06-Jul-92	31616		1600		15841	00-Jan-00									pbayou	HP	7303
bayouwq	BUS9204	06-Jul-92	31616		2400		15843	00-Jan-00									pbayou	HP	7295
bayouwq	BUN9204	06-Jul-92	31616		1000		15845	00-Jan-00									pbayou	HP	7285
bayouwq	BUL9203	06-Jul-92	31616		3700		15846	00-Jan-00									pbayou	HP	7281

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUG9202	06-Jul-92	31616		9700		15847	00-Jan-00									pbayou	HP	7273
bayouwq	BUB8803	07-Jul-88	31616		12400		11142	00-Jan-00									pothor1	HP	9891
bayouwq	BUA8803	07-Jul-88	31616		47000		11351	00-Jan-00									pothor1	HP	9899
bayouwq	BUO8803	07-Jul-88	31616		31000		11354	00-Jan-00									pothor1	HP	9898
bayouwq	BUM8803	07-Jul-88	31616		4600		11357	00-Jan-00									pothor1	HP	9897
bayouwq	BUJ8803	07-Jul-88	31616		10		11360	00-Jan-00									pothor1	HP	9895
bayouwq	BUH8803	07-Jul-88	31616		1510		11362	00-Jan-00									pothor1	HP	9894
bayouwq	BUD8803	07-Jul-88	31616		13700		11364	00-Jan-00									pothor1	HP	9892
bayouwq	BUX8803	07-Jul-88	31616		260		15840	00-Jan-00									pothor1	HP	9904
bayouwq	BUW8803	07-Jul-88	31616		25000		15841	00-Jan-00									pothor1	HP	9903
bayouwq	BUU8803	07-Jul-88	31616		33000		15842	00-Jan-00									pothor1	HP	9902
bayouwq	BUS8803	07-Jul-88	31616		38000		15843	00-Jan-00									pothor1	HP	9900
bayouwq	BUL8803	07-Jul-88	31616		430		15846	00-Jan-00									pothor1	HP	9896
bayouwq	BUG8803	07-Jul-88	31616		12300		15847	00-Jan-00									pothor1	HP	9893
bayouwq	BUA9310	07-Jul-93	31616		14000	BM	11351	00-Jan-00							BM		pbayou	HP	7777
bayouwq	BUB9110	09-Jul-91	31616		9300		11142	00-Jan-00									pbayou	HP	6509
bayouwq	BUE9109	09-Jul-91	31616		2100		11163	00-Jan-00									pbayou	HP	6513
bayouwq	BUA9117	09-Jul-91	31616		9500		11351	00-Jan-00									pbayou	HP	6535
bayouwq	BUP9112	09-Jul-91	31616		32000		11353	00-Jan-00									pbayou	HP	6531
bayouwq	BUO9112	09-Jul-91	31616		44000		11354	00-Jan-00									pbayou	HP	6529
bayouwq	BUM9110	09-Jul-91	31616		7500		11357	00-Jan-00									pbayou	HP	6525
bayouwq	BUK9113	09-Jul-91	31616		8000		11359	00-Jan-00									pbayou	HP	6521
bayouwq	BUJ9117	09-Jul-91	31616		9400		11360	00-Jan-00									pbayou	HP	6519
bayouwq	BUH9116	09-Jul-91	31616		23000		11362	00-Jan-00									pbayou	HP	6517
bayouwq	BUD9115	09-Jul-91	31616		9100		11364	00-Jan-00									pbayou	HP	6511
bayouwq	BUW9116	09-Jul-91	31616		77000		15841	00-Jan-00									pbayou	HP	6543
bayouwq	BUU9108	09-Jul-91	31616		100000		15842	00-Jan-00									pbayou	HP	6541
bayouwq	BUS9117	09-Jul-91	31616		9000		15843	00-Jan-00									pbayou	HP	6537
bayouwq	BUQ9110	09-Jul-91	31616		9600		15844	00-Jan-00									pbayou	HP	6533
bayouwq	BUN9117	09-Jul-91	31616		21000		15845	00-Jan-00									pbayou	HP	6527
bayouwq	BUL9117	09-Jul-91	31616		7200		15846	00-Jan-00									pbayou	HP	6523
bayouwq	BUG9109	09-Jul-91	31616		81000		15847	00-Jan-00									pbayou	HP	6515
bayouwq	BUB9021	10-Jul-90	31616		4800		11142	00-Jan-00									pothor1	HP	11930
bayouwq	BUE9021	10-Jul-90	31616		1400		11163	00-Jan-00									pothor1	HP	11934
bayouwq	BUA9022	10-Jul-90	31616		860		11351	00-Jan-00									pothor1	HP	11954
bayouwq	BUO9019	10-Jul-90	31616		24000		11354	00-Jan-00									pothor1	HP	11950
bayouwq	BUM9021	10-Jul-90	31616		4300		11357	00-Jan-00									pothor1	HP	11946
bayouwq	BUK9020	10-Jul-90	31616		2800		11359	00-Jan-00									pothor1	HP	11942
bayouwq	BUJ9020	10-Jul-90	31616		5300		11360	00-Jan-00									pothor1	HP	11940
bayouwq	BUH9021	10-Jul-90	31616		1400		11362	00-Jan-00									pothor1	HP	11938
bayouwq	BUD9021	10-Jul-90	31616		3400		11364	00-Jan-00									pothor1	HP	11932
bayouwq	BUX9015	10-Jul-90	31616		680		15840	00-Jan-00									pothor1	HP	11966
bayouwq	BUW9021	10-Jul-90	31616		6000		15841	00-Jan-00									pothor1	HP	11962
bayouwq	BUU9021	10-Jul-90	31616		12000		15842	00-Jan-00									pothor1	HP	11960
bayouwq	BUS9021	10-Jul-90	31616		15000		15843	00-Jan-00									pothor1	HP	11956
bayouwq	BUQ9021	10-Jul-90	31616		1800		15844	00-Jan-00									pothor1	HP	11952
bayouwq	BUN9022	10-Jul-90	31616		4050		15845	00-Jan-00									pothor1	HP	11948
bayouwq	BUL9020	10-Jul-90	31616		3300		15846	00-Jan-00									pothor1	HP	11944
bayouwq	BUG9021	10-Jul-90	31616		3300		15847	00-Jan-00									pothor1	HP	11936
bayouwq	BUA8907	13-Jul-89	31616		530		11351	00-Jan-00									pothor1	HP	10197
bayouwq	BUO8906	13-Jul-89	31616		230		11354	00-Jan-00									pothor1	HP	10195
bayouwq	BUM8907	13-Jul-89	31616		520		11357	00-Jan-00									pothor1	HP	10193
bayouwq	BUJ8907	13-Jul-89	31616		620		11360	00-Jan-00									pothor1	HP	10191
bayouwq	BUH8907	13-Jul-89	31616		480		11362	00-Jan-00									pothor1	HP	10190
bayouwq	BUX8907	13-Jul-89	31616		1400		15840	00-Jan-00									pothor1	HP	10202
bayouwq	BUW8905	13-Jul-89	31616		1100		15841	00-Jan-00									pothor1	HP	10201
bayouwq	BUU8907	13-Jul-89	31616		1300		15842	00-Jan-00									pothor1	HP	10200
bayouwq	BUS8907	13-Jul-89	31616		1700		15843	00-Jan-00									pothor1	HP	10198

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUQ8905	13-Jul-89	31616		290		15844	00-Jan-00									poth1	HP	10196
bayouwq	BUN8905	13-Jul-89	31616		350		15845	00-Jan-00									poth1	HP	10194
bayouwq	BUL8907	13-Jul-89	31616		4200		15846	00-Jan-00									poth1	HP	10192
bayouwq	BUG8907	13-Jul-89	31616		12000		15847	00-Jan-00									poth1	HP	10189
bayouwq	BUA8604	14-Jul-86	31616		5200		11351	00-Jan-00									poth1	HP	9662
bayouwq	BUO8604	14-Jul-86	31616		3900		11354	00-Jan-00									poth1	HP	9660
bayouwq	BUM8604	14-Jul-86	31616		1180		11357	00-Jan-00									poth1	HP	9657
bayouwq	BUJ8604	14-Jul-86	31616		10		11360	00-Jan-00									poth1	HP	9654
bayouwq	BUH8604	14-Jul-86	31616		1720		11362	00-Jan-00									poth1	HP	9652
bayouwq	BUD8602	14-Jul-86	31616		420		11364	00-Jan-00									poth1	HP	9650
bayouwq	BUX8604	14-Jul-86	31616		1190		15840	00-Jan-00									poth1	HP	9671
bayouwq	BUW8604	14-Jul-86	31616		2300		15841	00-Jan-00									poth1	HP	9668
bayouwq	BUU8604	14-Jul-86	31616		8200		15842	00-Jan-00									poth1	HP	9666
bayouwq	BUS8604	14-Jul-86	31616		5100		15843	00-Jan-00									poth1	HP	9665
bayouwq	BUL8604	14-Jul-86	31616		120		15846	00-Jan-00									poth1	HP	9656
bayouwq	BUG8601	14-Jul-86	31616		160		15847	00-Jan-00									poth1	HP	9651
bayouwq	BUA9311	14-Jul-93	31616		450	BM	11351	00-Jan-00							BM		pbayou	HP	7822
bayouwq	BUB9603	15-Jul-96	31616		410		11142	00-Jan-00									xls96	HP	1615
bayouwq	BUG9602	15-Jul-96	31616		2400		11142	00-Jan-00									xls96	HP	1616
bayouwq	BUE9610	15-Jul-96	31616		360		11163	00-Jan-00									xls96	HP	1618
bayouwq	BUV9611	15-Jul-96	31616		1300		11345	00-Jan-00									xls96	HP	1634
bayouwq	BUA9617	15-Jul-96	31616		2100	BM	11351	00-Jan-00							BM		xls96	HP	1631
bayouwq	BUP9610	15-Jul-96	31616		950		11353	00-Jan-00									xls96	HP	1629
bayouwq	BUO9610	15-Jul-96	31616		910		11354	00-Jan-00									xls96	HP	1628
bayouwq	BUM9609	15-Jul-96	31616		460		11357	00-Jan-00									xls96	HP	1626
bayouwq	BUK9610	15-Jul-96	31616		730		11359	00-Jan-00									xls96	HP	1624
bayouwq	BUJ9607	15-Jul-96	31616		1000		11360	00-Jan-00									xls96	HP	1623
bayouwq	BUI9610	15-Jul-96	31616		1300		11361	00-Jan-00									xls96	HP	1622
bayouwq	BUH9610	15-Jul-96	31616		740		11362	00-Jan-00									xls96	HP	1621
bayouwq	BUF9608	15-Jul-96	31616		500		11363	00-Jan-00									xls96	HP	1619
bayouwq	BUD9610	15-Jul-96	31616		330		11364	00-Jan-00									xls96	HP	1617
bayouwq	BUS9610	15-Jul-96	31616		1000		15843	00-Jan-00									xls96	HP	1632
bayouwq	BUQ9610	15-Jul-96	31616		1000		15844	00-Jan-00									xls96	HP	1630
bayouwq	BUN9610	15-Jul-96	31616		800		15845	00-Jan-00									xls96	HP	1627
bayouwq	BUL9610	15-Jul-96	31616		670		15846	00-Jan-00									xls96	HP	1625
bayouwq	BUG9608	15-Jul-96	31616		430		15847	00-Jan-00									xls96	HP	1620
bayouwq	BUB9111	16-Jul-91	31616		1100		11142	00-Jan-00									pbayou	HP	6584
bayouwq	BUE9110	16-Jul-91	31616		810		11163	00-Jan-00									pbayou	HP	6588
bayouwq	BUA9118	16-Jul-91	31616		1300		11351	00-Jan-00									pbayou	HP	6610
bayouwq	BUP9113	16-Jul-91	31616		2300		11353	00-Jan-00									pbayou	HP	6606
bayouwq	BUO9113	16-Jul-91	31616		2100		11354	00-Jan-00									pbayou	HP	6604
bayouwq	BUM9111	16-Jul-91	31616		7500		11357	00-Jan-00									pbayou	HP	6600
bayouwq	BUK9114	16-Jul-91	31616		8100		11359	00-Jan-00									pbayou	HP	6596
bayouwq	BUJ9118	16-Jul-91	31616		2200		11360	00-Jan-00									pbayou	HP	6594
bayouwq	BUH9117	16-Jul-91	31616		840		11362	00-Jan-00									pbayou	HP	6592
bayouwq	BUD9116	16-Jul-91	31616		990		11364	00-Jan-00									pbayou	HP	6586
bayouwq	BUW9117	16-Jul-91	31616		8300		15841	00-Jan-00									pbayou	HP	6618
bayouwq	BUU9109	16-Jul-91	31616		5500		15842	00-Jan-00									pbayou	HP	6616
bayouwq	BUS9118	16-Jul-91	31616		3400		15843	00-Jan-00									pbayou	HP	6612
bayouwq	BUN9118	16-Jul-91	31616		2800		15845	00-Jan-00									pbayou	HP	6602
bayouwq	BUL9118	16-Jul-91	31616		3000		15846	00-Jan-00									pbayou	HP	6598
bayouwq	BUG9110	16-Jul-91	31616		2600		15847	00-Jan-00									pbayou	HP	6590
bayouwq	BUA9023	17-Jul-90	31616		27000		11351	00-Jan-00									poth1	HP	12025
bayouwq	BUO9020	17-Jul-90	31616		39000		11354	00-Jan-00									poth1	HP	12021
bayouwq	BUJ9021	17-Jul-90	31616		8000		11360	00-Jan-00									poth1	HP	12011
bayouwq	BUX9016	17-Jul-90	31616		2000		15840	00-Jan-00									poth1	HP	12037
bayouwq	BUW9022	17-Jul-90	31616		180000		15841	00-Jan-00									poth1	HP	12033
bayouwq	BUU9022	17-Jul-90	31616		200000		15842	00-Jan-00									poth1	HP	12031

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUS9022	17-Jul-90	31616		26000		15843	00-Jan-00									pothel	HP	12027
bayouwq	BUQ9022	17-Jul-90	31616		33000		15844	00-Jan-00									pothel	HP	12023
bayouwq	BUN9023	17-Jul-90	31616		20000		15845	00-Jan-00									pothel	HP	12019
bayouwq	BUX9611	17-Jul-96	31616		2300		15840	00-Jan-00									xls96	HP	1745
bayouwq	BUW9609	17-Jul-96	31616		28000		15841	00-Jan-00									xls96	HP	1744
bayouwq	BUB9413	19-Jul-94	31616		170		11142	00-Jan-00									9495a	HP	1418
bayouwq	BUC9411	19-Jul-94	31616		2900		11142	00-Jan-00									9495a	HP	1420
bayouwq	BUE9413	19-Jul-94	31616		770		11163	00-Jan-00									9495a	HP	1424
bayouwq	BUV9413	19-Jul-94	31616		870		11345	00-Jan-00									9495a	HP	1458
bayouwq	BUA9415	19-Jul-94	31616		3300		11351	00-Jan-00									9495a	HP	1450
bayouwq	BUP9413	19-Jul-94	31616		360		11353	00-Jan-00									9495a	HP	1446
bayouwq	BUO9413	19-Jul-94	31616		410		11354	00-Jan-00									9495a	HP	1444
bayouwq	BUM9413	19-Jul-94	31616		3000		11357	00-Jan-00									9495a	HP	1440
bayouwq	BUK9413	19-Jul-94	31616		860		11359	00-Jan-00									9495a	HP	1436
bayouwq	BUJ9412	19-Jul-94	31616		2200		11360	00-Jan-00									9495a	HP	1434
bayouwq	BUI9408	19-Jul-94	31616		3700		11361	00-Jan-00									9495a	HP	1432
bayouwq	BUH9413	19-Jul-94	31616		4300		11362	00-Jan-00									9495a	HP	1430
bayouwq	BUF9408	19-Jul-94	31616		700		11363	00-Jan-00									9495a	HP	1426
bayouwq	BUD9413	19-Jul-94	31616		72		11364	00-Jan-00									9495a	HP	1422
bayouwq	BUW9410	19-Jul-94	31616		850		15841	00-Jan-00									9495a	HP	1460
bayouwq	BUS9413	19-Jul-94	31616		410		15843	00-Jan-00									9495a	HP	1452
bayouwq	BUN9413	19-Jul-94	31616		770		15845	00-Jan-00									9495a	HP	1442
bayouwq	BUL9413	19-Jul-94	31616		890		15846	00-Jan-00									9495a	HP	1438
bayouwq	BUG9413	19-Jul-94	31616		920		15847	00-Jan-00									9495a	HP	1428
bayouwq	BUV8303	20-Jul-83	31616		5000		11345	00-Jan-00									pothel	HP	9028
bayouwq	BUA8304	20-Jul-83	31616		3000		11351	00-Jan-00									pothel	HP	9023
bayouwq	BUO8304	20-Jul-83	31616		11000		11354	00-Jan-00									pothel	HP	9021
bayouwq	BUM8305	20-Jul-83	31616		6000		11357	00-Jan-00									pothel	HP	9018
bayouwq	BUJ8305	20-Jul-83	31616		1		11360	00-Jan-00									pothel	HP	9015
bayouwq	BUH8305	20-Jul-83	31616		1		11362	00-Jan-00									pothel	HP	9013
bayouwq	BUX8303	20-Jul-83	31616		1000		15840	00-Jan-00									pothel	HP	9032
bayouwq	BUW8303	20-Jul-83	31616		2000		15841	00-Jan-00									pothel	HP	9029
bayouwq	BUS8303	20-Jul-83	31616		200000		15843	00-Jan-00									pothel	HP	9026
bayouwq	BUB8701	21-Jul-87	31616		300		11142	00-Jan-00									pothel	HP	9822
bayouwq	BUA8704	21-Jul-87	31616		41000		11351	00-Jan-00									pothel	HP	9830
bayouwq	BUO8704	21-Jul-87	31616		27000		11354	00-Jan-00									pothel	HP	9829
bayouwq	BUM8704	21-Jul-87	31616		9800		11357	00-Jan-00									pothel	HP	9828
bayouwq	BUJ8704	21-Jul-87	31616		10		11360	00-Jan-00									pothel	HP	9826
bayouwq	BUH8704	21-Jul-87	31616		13400		11362	00-Jan-00									pothel	HP	9825
bayouwq	BUD8704	21-Jul-87	31616		350		11364	00-Jan-00									pothel	HP	9823
bayouwq	BUX8704	21-Jul-87	31616		5800		15840	00-Jan-00									pothel	HP	9834
bayouwq	BUW8704	21-Jul-87	31616		38000		15841	00-Jan-00									pothel	HP	9833
bayouwq	BUU8704	21-Jul-87	31616		30000		15842	00-Jan-00									pothel	HP	9832
bayouwq	BUS8704	21-Jul-87	31616		56000		15843	00-Jan-00									pothel	HP	9831
bayouwq	BUL8704	21-Jul-87	31616		7000		15846	00-Jan-00									pothel	HP	9827
bayouwq	BUG8704	21-Jul-87	31616		87000		15847	00-Jan-00									pothel	HP	9824
bayouwq	BUB9112	23-Jul-91	31616		8000		11142	00-Jan-00									pbayou	HP	6658
bayouwq	BUE9111	23-Jul-91	31616		1200		11163	00-Jan-00									pbayou	HP	6662
bayouwq	BUA9119	23-Jul-91	31616		31000		11351	00-Jan-00									pbayou	HP	6684
bayouwq	BUP9114	23-Jul-91	31616		8900		11353	00-Jan-00									pbayou	HP	6680
bayouwq	BUO9114	23-Jul-91	31616		9500		11354	00-Jan-00									pbayou	HP	6678
bayouwq	BUM9112	23-Jul-91	31616		24000		11357	00-Jan-00									pbayou	HP	6674
bayouwq	BUK9115	23-Jul-91	31616		17000		11359	00-Jan-00									pbayou	HP	6670
bayouwq	BUJ9119	23-Jul-91	31616		12000		11360	00-Jan-00									pbayou	HP	6668
bayouwq	BUH9118	23-Jul-91	31616		7200		11362	00-Jan-00									pbayou	HP	6666
bayouwq	BUD9117	23-Jul-91	31616		9500		11364	00-Jan-00									pbayou	HP	6660
bayouwq	BUW9118	23-Jul-91	31616		290000		15841	00-Jan-00									pbayou	HP	6692
bayouwq	BUU9110	23-Jul-91	31616		250000		15842	00-Jan-00									pbayou	HP	6690

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUS9119	23-Jul-91	31616		57000		15843	00-Jan-00									pbayou	HP	6686
bayouwq	BUQ9111	23-Jul-91	31616		45000		15844	00-Jan-00									pbayou	HP	6682
bayouwq	BUN9119	23-Jul-91	31616		29000		15845	00-Jan-00									pbayou	HP	6676
bayouwq	BUL9119	23-Jul-91	31616		22000		15846	00-Jan-00									pbayou	HP	6672
bayouwq	BUG9111	23-Jul-91	31616		9700		15847	00-Jan-00									pbayou	HP	6664
bayouwq	BUB9022	24-Jul-90	31616		5700		11142	00-Jan-00									pothor1	HP	12072
bayouwq	BUE9022	24-Jul-90	31616		12000		11163	00-Jan-00									pothor1	HP	12076
bayouwq	BUA9024	24-Jul-90	31616		28000		11351	00-Jan-00									pothor1	HP	12096
bayouwq	BUO9021	24-Jul-90	31616		11000		11354	00-Jan-00									pothor1	HP	12092
bayouwq	BUM9022	24-Jul-90	31616		260		11357	00-Jan-00									pothor1	HP	12088
bayouwq	BUK9021	24-Jul-90	31616		950		11359	00-Jan-00									pothor1	HP	12084
bayouwq	BUJ9022	24-Jul-90	31616		29000		11360	00-Jan-00									pothor1	HP	12082
bayouwq	BUH9022	24-Jul-90	31616		3500		11362	00-Jan-00									pothor1	HP	12080
bayouwq	BUD9022	24-Jul-90	31616		6000		11364	00-Jan-00									pothor1	HP	12074
bayouwq	BUN9024	24-Jul-90	31616		33000		15845	00-Jan-00									pothor1	HP	12090
bayouwq	BUL9021	24-Jul-90	31616		820		15846	00-Jan-00									pothor1	HP	12086
bayouwq	BUG9022	24-Jul-90	31616		15000		15847	00-Jan-00									pothor1	HP	12078
bayouwq	BUA9312	26-Jul-93	31616		3600		11351	00-Jan-00									pbayou	HP	8229
bayouwq	BUV9306	27-Jul-93	31616		640		11345	00-Jan-00									pbayou	HP	7987
bayouwq	BUA9313	27-Jul-93	31616		2800		11351	00-Jan-00									pbayou	HP	7981
bayouwq	BUP9304	27-Jul-93	31616		420		11353	00-Jan-00									pbayou	HP	7977
bayouwq	BUM9302	27-Jul-93	31616		2000		11357	00-Jan-00									pbayou	HP	7971
bayouwq	BUJ9304	27-Jul-93	31616		2000		11360	00-Jan-00									pbayou	HP	7965
bayouwq	BUH9303	27-Jul-93	31616		7400		11362	00-Jan-00									pbayou	HP	7963
bayouwq	BUD9304	27-Jul-93	31616		680		11364	00-Jan-00									pbayou	HP	7957
bayouwq	BUW9303	27-Jul-93	31616		260		15841	00-Jan-00									pbayou	HP	7989
bayouwq	BUS9304	27-Jul-93	31616		2000		15843	00-Jan-00									pbayou	HP	7983
bayouwq	BUN9304	27-Jul-93	31616		1500		15845	00-Jan-00									pbayou	HP	7973
bayouwq	BUB9414	27-Jul-94	31616		1500		11142	00-Jan-00									9495a	HP	1488
bayouwq	BUG9412	27-Jul-94	31616		350		11142	00-Jan-00									9495a	HP	1490
bayouwq	BUE9414	27-Jul-94	31616		2300		11163	00-Jan-00									9495a	HP	1494
bayouwq	BUV9414	27-Jul-94	31616		3500		11345	00-Jan-00									9495a	HP	1526
bayouwq	BUA9416	27-Jul-94	31616		3000		11351	00-Jan-00									9495a	HP	1518
bayouwq	BUP9414	27-Jul-94	31616		950		11353	00-Jan-00									9495a	HP	1516
bayouwq	BUO9414	27-Jul-94	31616		3700		11354	00-Jan-00									9495a	HP	1514
bayouwq	BUM9414	27-Jul-94	31616		2800		11357	00-Jan-00									9495a	HP	1510
bayouwq	BUK9414	27-Jul-94	31616		22000		11359	00-Jan-00									9495a	HP	1506
bayouwq	BUJ9413	27-Jul-94	31616		2900		11360	00-Jan-00									9495a	HP	1504
bayouwq	BUI9409	27-Jul-94	31616		3600		11361	00-Jan-00									9495a	HP	1502
bayouwq	BUH9414	27-Jul-94	31616		35000		11362	00-Jan-00									9495a	HP	1500
bayouwq	BUF9409	27-Jul-94	31616		3000		11363	00-Jan-00									9495a	HP	1496
bayouwq	BUD9414	27-Jul-94	31616		260		11364	00-Jan-00									9495a	HP	1492
bayouwq	BUX9410	27-Jul-94	31616		330		15840	00-Jan-00									9495a	HP	1530
bayouwq	BUW9411	27-Jul-94	31616		1300		15841	00-Jan-00									9495a	HP	1528
bayouwq	BUU9410	27-Jul-94	31616		3200		15842	00-Jan-00									9495a	HP	1524
bayouwq	BUS9414	27-Jul-94	31616		4400		15843	00-Jan-00									9495a	HP	1520
bayouwq	BUN9414	27-Jul-94	31616		1600		15845	00-Jan-00									9495a	HP	1512
bayouwq	BUL9414	27-Jul-94	31616		3600		15846	00-Jan-00									9495a	HP	1508
bayouwq	BUG9414	27-Jul-94	31616		2200		15847	00-Jan-00									9495a	HP	1498
bayouwq	BUA9314	28-Jul-93	31616		790	BM	11351	00-Jan-00							BM		pbayou	HP	7870
bayouwq	BUB9113	29-Jul-91	31616		1100		11142	00-Jan-00									pbayou	HP	6734
bayouwq	BUE9112	29-Jul-91	31616		680		11163	00-Jan-00									pbayou	HP	6738
bayouwq	BUV9101	29-Jul-91	31616		890		11345	00-Jan-00									pbayou	HP	6770
bayouwq	BUA9120	29-Jul-91	31616		2700		11351	00-Jan-00									pbayou	HP	6762
bayouwq	BUP9115	29-Jul-91	31616		4000		11353	00-Jan-00									pbayou	HP	6758
bayouwq	BUO9115	29-Jul-91	31616		2800		11354	00-Jan-00									pbayou	HP	6756
bayouwq	BUM9113	29-Jul-91	31616		3600		11357	00-Jan-00									pbayou	HP	6752
bayouwq	BUK9116	29-Jul-91	31616		5900		11359	00-Jan-00									pbayou	HP	6748

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUJ9120	29-Jul-91	31616		1200		11360	00-Jan-00									pbayou	HP	6746
bayouwq	BUJ9101	29-Jul-91	31616		890		11361	00-Jan-00									pbayou	HP	6744
bayouwq	BUH9119	29-Jul-91	31616		720		11362	00-Jan-00									pbayou	HP	6742
bayouwq	BUD9118	29-Jul-91	31616		990		11364	00-Jan-00									pbayou	HP	6736
bayouwq	BUX9103	29-Jul-91	31616		200		15840	00-Jan-00									pbayou	HP	6776
bayouwq	BUW9119	29-Jul-91	31616		3000		15841	00-Jan-00									pbayou	HP	6772
bayouwq	BUU9111	29-Jul-91	31616		2900		15842	00-Jan-00									pbayou	HP	6768
bayouwq	BUS9120	29-Jul-91	31616		1100		15843	00-Jan-00									pbayou	HP	6764
bayouwq	BUQ9112	29-Jul-91	31616		3300		15844	00-Jan-00									pbayou	HP	6760
bayouwq	BUN9120	29-Jul-91	31616		1500		15845	00-Jan-00									pbayou	HP	6754
bayouwq	BUL9120	29-Jul-91	31616		5200		15846	00-Jan-00									pbayou	HP	6750
bayouwq	BUG9112	29-Jul-91	31616		1500		15847	00-Jan-00									pbayou	HP	6740
bayouwq	BUA9618	29-Jul-96	31616		3700	BM	11351	00-Jan-00							BM		xls96	HP	1859
bayouwq	BUA8504	30-Jul-85	31616		104000		11351	00-Jan-00									pothor1	HP	9470
bayouwq	BUO8504	30-Jul-85	31616		223000		11354	00-Jan-00									pothor1	HP	9468
bayouwq	BUM8506	30-Jul-85	31616		34000		11357	00-Jan-00									pothor1	HP	9465
bayouwq	BUK8506	30-Jul-85	31616		1410		11359	00-Jan-00									pothor1	HP	9463
bayouwq	BUJ8506	30-Jul-85	31616		6600		11360	00-Jan-00									pothor1	HP	9462
bayouwq	BUH8506	30-Jul-85	31616		38000		11362	00-Jan-00									pothor1	HP	9460
bayouwq	BUX8506	30-Jul-85	31616		4600		15840	00-Jan-00									pothor1	HP	9479
bayouwq	BUW8506	30-Jul-85	31616		41000		15841	00-Jan-00									pothor1	HP	9476
bayouwq	BUU8506	30-Jul-85	31616		123000		15842	00-Jan-00									pothor1	HP	9474
bayouwq	BUS8506	30-Jul-85	31616		79000		15843	00-Jan-00									pothor1	HP	9473
bayouwq	BUN8502	30-Jul-85	31616		81000		15845	00-Jan-00									pothor1	HP	9466
bayouwq	BUL8503	30-Jul-85	31616		60		15846	00-Jan-00									pothor1	HP	9464
bayouwq	BUB9023	31-Jul-90	31616		3900		11142	00-Jan-00									pothor1	HP	12143
bayouwq	BUE9023	31-Jul-90	31616		52000		11163	00-Jan-00									pothor1	HP	12147
bayouwq	BUA9025	31-Jul-90	31616		130000		11351	00-Jan-00									pothor1	HP	12167
bayouwq	BUO9022	31-Jul-90	31616		140000		11354	00-Jan-00									pothor1	HP	12163
bayouwq	BUM9023	31-Jul-90	31616		69000		11357	00-Jan-00									pothor1	HP	12159
bayouwq	BUK9022	31-Jul-90	31616		90000		11359	00-Jan-00									pothor1	HP	12155
bayouwq	BUJ9023	31-Jul-90	31616		45000		11360	00-Jan-00									pothor1	HP	12153
bayouwq	BUH9023	31-Jul-90	31616		75000		11362	00-Jan-00									pothor1	HP	12151
bayouwq	BUD9023	31-Jul-90	31616		14000		11364	00-Jan-00									pothor1	HP	12145
bayouwq	BUW9023	31-Jul-90	31616		72000		15841	00-Jan-00									pothor1	HP	12175
bayouwq	BUS9023	31-Jul-90	31616		99000		15843	00-Jan-00									pothor1	HP	12169
bayouwq	BUQ9023	31-Jul-90	31616		130000		15844	00-Jan-00									pothor1	HP	12165
bayouwq	BUN9025	31-Jul-90	31616		150000		15845	00-Jan-00									pothor1	HP	12161
bayouwq	BUL9022	31-Jul-90	31616		130000		15846	00-Jan-00									pothor1	HP	12157
bayouwq	BUG9023	31-Jul-90	31616		57000		15847	00-Jan-00									pothor1	HP	12149
bayouwq	BUA9514	31-Jul-95	31616		100000	BM	11351	00-Jan-00							BM		9495a	HP	5381
bayouwq	BUB9604	31-Jul-96	31616		4900		11142	00-Jan-00									xls96	HP	1922
bayouwq	BUK9603	31-Jul-96	31616		4400		11142	00-Jan-00									xls96	HP	1923
bayouwq	BUE9611	31-Jul-96	31616		520		11163	00-Jan-00									xls96	HP	1925
bayouwq	BUV9612	31-Jul-96	31616		2600		11345	00-Jan-00									xls96	HP	1941
bayouwq	BUA9619	31-Jul-96	31616		7900	BM	11351	00-Jan-00							BM		xls96	HP	1938
bayouwq	BUK9611	31-Jul-96	31616		3700		11353	00-Jan-00									xls96	HP	1936
bayouwq	BUO9611	31-Jul-96	31616		3100		11354	00-Jan-00									xls96	HP	1935
bayouwq	BUM9610	31-Jul-96	31616		5600		11357	00-Jan-00									xls96	HP	1933
bayouwq	BUK9611	31-Jul-96	31616		7600		11359	00-Jan-00									xls96	HP	1931
bayouwq	BUJ9608	31-Jul-96	31616		5500		11360	00-Jan-00									xls96	HP	1930
bayouwq	BUJ9611	31-Jul-96	31616		4500		11361	00-Jan-00									xls96	HP	1929
bayouwq	BUH9611	31-Jul-96	31616		4000		11362	00-Jan-00									xls96	HP	1928
bayouwq	BUF9609	31-Jul-96	31616		2900		11363	00-Jan-00									xls96	HP	1926
bayouwq	BUD9611	31-Jul-96	31616		2000		11364	00-Jan-00									xls96	HP	1924
bayouwq	BUX9612	31-Jul-96	31616		1000		15840	00-Jan-00									xls96	HP	1943
bayouwq	BUW9610	31-Jul-96	31616		4000		15841	00-Jan-00									xls96	HP	1942
bayouwq	BUJ9611	31-Jul-96	31616		4600		15843	00-Jan-00									xls96	HP	1939

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUQ9611	31-Jul-96	31616		7000		15844	00-Jan-00									xls96	HP	1937
bayouwq	BUN9611	31-Jul-96	31616		4600		15845	00-Jan-00									xls96	HP	1934
bayouwq	BUL9611	31-Jul-96	31616		7500		15846	00-Jan-00									xls96	HP	1932
bayouwq	BUG9609	31-Jul-96	31616		3200		15847	00-Jan-00									xls96	HP	1927
bayouwq	BUB8804	01-Aug-88	31616		500		11142	00-Jan-00									poth1	HP	9915
bayouwq	BUO8804	01-Aug-88	31616		2400		11354	00-Jan-00									poth1	HP	9922
bayouwq	BUM8804	01-Aug-88	31616		160		11357	00-Jan-00									poth1	HP	9921
bayouwq	BUJ8804	01-Aug-88	31616		100		11360	00-Jan-00									poth1	HP	9919
bayouwq	BUH8804	01-Aug-88	31616		20		11362	00-Jan-00									poth1	HP	9918
bayouwq	BUD8804	01-Aug-88	31616		310		11364	00-Jan-00									poth1	HP	9916
bayouwq	BUX8804	01-Aug-88	31616		130		15840	00-Jan-00									poth1	HP	9928
bayouwq	BUW8804	01-Aug-88	31616		25000		15841	00-Jan-00									poth1	HP	9927
bayouwq	BUU8804	01-Aug-88	31616		8800		15842	00-Jan-00									poth1	HP	9926
bayouwq	BUS8804	01-Aug-88	31616		40000		15843	00-Jan-00									poth1	HP	9924
bayouwq	BUL8804	01-Aug-88	31616		260		15846	00-Jan-00									poth1	HP	9920
bayouwq	BUG8804	01-Aug-88	31616		3400		15847	00-Jan-00									poth1	HP	9917
bayouwq	BUV8404	04-Aug-84	31616		144000		11345	00-Jan-00									poth1	HP	9251
bayouwq	BUA8404	04-Aug-84	31616		24167		11351	00-Jan-00									poth1	HP	9246
bayouwq	BUO8403	04-Aug-84	31616		3100		11354	00-Jan-00									poth1	HP	9244
bayouwq	BUM8404	04-Aug-84	31616		7670		11357	00-Jan-00									poth1	HP	9241
bayouwq	BUJ8404	04-Aug-84	31616		1		11360	00-Jan-00									poth1	HP	9238
bayouwq	BUH8403	04-Aug-84	31616		800		11362	00-Jan-00									poth1	HP	9236
bayouwq	BUX8404	04-Aug-84	31616		94		15840	00-Jan-00									poth1	HP	9255
bayouwq	BUS8404	04-Aug-84	31616		34167		15843	00-Jan-00									poth1	HP	9249
bayouwq	BUA9315	04-Aug-93	31616		11000	BM	11351	00-Jan-00							BM		pbayou	HP	9589
bayouwq	BUB9114	05-Aug-91	31616		660		11142	00-Jan-00									pbayou	HP	8355
bayouwq	BUE9113	05-Aug-91	31616		520		11163	00-Jan-00									pbayou	HP	8359
bayouwq	BUV9102	05-Aug-91	31616		20000		11345	00-Jan-00									pbayou	HP	8389
bayouwq	BUA9121	05-Aug-91	31616		1800		11351	00-Jan-00									pbayou	HP	8381
bayouwq	BUP9116	05-Aug-91	31616		4700		11353	00-Jan-00									pbayou	HP	8377
bayouwq	BUO9116	05-Aug-91	31616		2500		11354	00-Jan-00									pbayou	HP	8375
bayouwq	BUM9114	05-Aug-91	31616		2000		11357	00-Jan-00									pbayou	HP	8371
bayouwq	BUK9117	05-Aug-91	31616		3000		11359	00-Jan-00									pbayou	HP	8367
bayouwq	BUJ9121	05-Aug-91	31616		1800		11360	00-Jan-00									pbayou	HP	8365
bayouwq	BUH9120	05-Aug-91	31616		1000		11362	00-Jan-00									pbayou	HP	8363
bayouwq	BUD9119	05-Aug-91	31616		610		11364	00-Jan-00									pbayou	HP	8357
bayouwq	BUX9104	05-Aug-91	31616		1300		15840	00-Jan-00									pbayou	HP	8395
bayouwq	BUW9120	05-Aug-91	31616		20000		15841	00-Jan-00									pbayou	HP	8391
bayouwq	BUU9112	05-Aug-91	31616		15000		15842	00-Jan-00									pbayou	HP	8387
bayouwq	BUS9121	05-Aug-91	31616		1500		15843	00-Jan-00									pbayou	HP	8383
bayouwq	BUQ9113	05-Aug-91	31616		1400		15844	00-Jan-00									pbayou	HP	8379
bayouwq	BUN9121	05-Aug-91	31616		2000		15845	00-Jan-00									pbayou	HP	8373
bayouwq	BUL9121	05-Aug-91	31616		2000		15846	00-Jan-00									pbayou	HP	8369
bayouwq	BUG9113	05-Aug-91	31616		3500		15847	00-Jan-00									pbayou	HP	8361
bayouwq	BUB9024	06-Aug-90	31616		1200		11142	00-Jan-00									poth1	HP	12214
bayouwq	BUE9024	06-Aug-90	31616		1400		11163	00-Jan-00									poth1	HP	12218
bayouwq	BUA9026	06-Aug-90	31616		5900		11351	00-Jan-00									poth1	HP	12240
bayouwq	BUP9001	06-Aug-90	31616		2400		11353	00-Jan-00									poth1	HP	12236
bayouwq	BUO9023	06-Aug-90	31616		2600		11354	00-Jan-00									poth1	HP	12234
bayouwq	BUM9024	06-Aug-90	31616		970		11357	00-Jan-00									poth1	HP	12230
bayouwq	BUK9023	06-Aug-90	31616		9100		11359	00-Jan-00									poth1	HP	12226
bayouwq	BUJ9024	06-Aug-90	31616		320		11360	00-Jan-00									poth1	HP	12224
bayouwq	BUH9024	06-Aug-90	31616		940		11362	00-Jan-00									poth1	HP	12222
bayouwq	BUD9024	06-Aug-90	31616		380		11364	00-Jan-00									poth1	HP	12216
bayouwq	BUW9024	06-Aug-90	31616		12000		15841	00-Jan-00									poth1	HP	12248
bayouwq	BUU9023	06-Aug-90	31616		5500		15842	00-Jan-00									poth1	HP	12246
bayouwq	BUS9024	06-Aug-90	31616		8600		15843	00-Jan-00									poth1	HP	12242
bayouwq	BUQ9024	06-Aug-90	31616		4200		15844	00-Jan-00									poth1	HP	12238

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUN9026	06-Aug-90	31616		2500		15845	00-Jan-00									poth1	HP	12232
bayouwq	BUL9023	06-Aug-90	31616		5200		15846	00-Jan-00									poth1	HP	12228
bayouwq	BUG9024	06-Aug-90	31616		7900		15847	00-Jan-00									poth1	HP	12220
bayouwq	BUV9613	09-Aug-96	31616		2100		11345	00-Jan-00									bayou95	HP	65
bayouwq	BUV9511	10-Aug-95	31616		2100		11345	00-Jan-00									9495a	HP	5931
bayouwq	BUA9316	11-Aug-93	31616		8500	BM	11351	00-Jan-00							BM		pbayou	HP	9637
bayouwq	BUB9115	13-Aug-91	31616		910		11142	00-Jan-00									pbayou	HP	8433
bayouwq	BUE9114	13-Aug-91	31616		1200		11163	00-Jan-00									pbayou	HP	8437
bayouwq	BUV9103	13-Aug-91	31616		52000		11345	00-Jan-00									pbayou	HP	8467
bayouwq	BUA9122	13-Aug-91	31616		5900		11351	00-Jan-00									pbayou	HP	8459
bayouwq	BUP9117	13-Aug-91	31616		7300		11353	00-Jan-00									pbayou	HP	8455
bayouwq	BUO9117	13-Aug-91	31616		6500		11354	00-Jan-00									pbayou	HP	8453
bayouwq	BUM9115	13-Aug-91	31616		1500		11357	00-Jan-00									pbayou	HP	8449
bayouwq	BUK9118	13-Aug-91	31616		1000		11359	00-Jan-00									pbayou	HP	8445
bayouwq	BUJ9122	13-Aug-91	31616		1300		11360	00-Jan-00									pbayou	HP	8443
bayouwq	BUH9121	13-Aug-91	31616		670		11362	00-Jan-00									pbayou	HP	8441
bayouwq	BUD9120	13-Aug-91	31616		1800		11364	00-Jan-00									pbayou	HP	8435
bayouwq	BUX9105	13-Aug-91	31616		9400		15840	00-Jan-00									pbayou	HP	8473
bayouwq	BUW9121	13-Aug-91	31616		160000		15841	00-Jan-00									pbayou	HP	8469
bayouwq	BUS9122	13-Aug-91	31616		2700		15843	00-Jan-00									pbayou	HP	8461
bayouwq	BUQ9114	13-Aug-91	31616		6500		15844	00-Jan-00									pbayou	HP	8457
bayouwq	BUN9122	13-Aug-91	31616		1200		15845	00-Jan-00									pbayou	HP	8451
bayouwq	BUL9122	13-Aug-91	31616		1200		15846	00-Jan-00									pbayou	HP	8447
bayouwq	BUG9114	13-Aug-91	31616		2200		15847	00-Jan-00									pbayou	HP	8439
bayouwq	BUB9605	13-Aug-96	31616		2500		11142	00-Jan-00									xls96	HP	2027
bayouwq	BUC9604	13-Aug-96	31616		2900		11142	00-Jan-00									xls96	HP	2028
bayouwq	BUE9612	13-Aug-96	31616		5600		11163	00-Jan-00									xls96	HP	2030
bayouwq	BUV9614	13-Aug-96	31616		21000		11345	00-Jan-00									xls96	HP	2046
bayouwq	BUA9620	13-Aug-96	31616		5600	BM	11351	00-Jan-00							BM		xls96	HP	2043
bayouwq	BUP9612	13-Aug-96	31616		5600		11353	00-Jan-00									xls96	HP	2041
bayouwq	BUO9612	13-Aug-96	31616		6000		11354	00-Jan-00									xls96	HP	2040
bayouwq	BUM9611	13-Aug-96	31616		5800		11357	00-Jan-00									xls96	HP	2038
bayouwq	BUK9612	13-Aug-96	31616		3500		11359	00-Jan-00									xls96	HP	2036
bayouwq	BUJ9609	13-Aug-96	31616		3100		11360	00-Jan-00									xls96	HP	2035
bayouwq	BUI9612	13-Aug-96	31616		4000		11361	00-Jan-00									xls96	HP	2034
bayouwq	BUH9612	13-Aug-96	31616		3600		11362	00-Jan-00									xls96	HP	2033
bayouwq	BUF9610	13-Aug-96	31616		2600		11363	00-Jan-00									xls96	HP	2031
bayouwq	BUD9612	13-Aug-96	31616		400		11364	00-Jan-00									xls96	HP	2029
bayouwq	BUX9613	13-Aug-96	31616		5950		15840	00-Jan-00									xls96	HP	2048
bayouwq	BUW9611	13-Aug-96	31616		5900		15841	00-Jan-00									xls96	HP	2047
bayouwq	BUS9612	13-Aug-96	31616		5000		15843	00-Jan-00									xls96	HP	2044
bayouwq	BUQ9612	13-Aug-96	31616		5700		15844	00-Jan-00									xls96	HP	2042
bayouwq	BUN9612	13-Aug-96	31616		4800		15845	00-Jan-00									xls96	HP	2039
bayouwq	BUL9612	13-Aug-96	31616		4300		15846	00-Jan-00									xls96	HP	2037
bayouwq	BUG9610	13-Aug-96	31616		8000		15847	00-Jan-00									xls96	HP	2032
bayouwq	BUB9025	14-Aug-90	31616		740		11142	00-Jan-00									poth1	HP	12287
bayouwq	BUE9025	14-Aug-90	31616		210		11163	00-Jan-00									poth1	HP	12291
bayouwq	BUA9027	14-Aug-90	31616		1400		11351	00-Jan-00									poth1	HP	12313
bayouwq	BUP9002	14-Aug-90	31616		790		11353	00-Jan-00									poth1	HP	12309
bayouwq	BUO9024	14-Aug-90	31616		330		11354	00-Jan-00									poth1	HP	12307
bayouwq	BUM9025	14-Aug-90	31616		9		11357	00-Jan-00									poth1	HP	12303
bayouwq	BUK9024	14-Aug-90	31616		770		11359	00-Jan-00									poth1	HP	12299
bayouwq	BUJ9025	14-Aug-90	31616		600		11360	00-Jan-00									poth1	HP	12297
bayouwq	BUH9025	14-Aug-90	31616		780		11362	00-Jan-00									poth1	HP	12295
bayouwq	BUD9025	14-Aug-90	31616		450		11364	00-Jan-00									poth1	HP	12289
bayouwq	BUW9025	14-Aug-90	31616		12000		15841	00-Jan-00									poth1	HP	12321
bayouwq	BUS9025	14-Aug-90	31616		1200		15843	00-Jan-00									poth1	HP	12315
bayouwq	BUQ9025	14-Aug-90	31616		2300		15844	00-Jan-00									poth1	HP	12311

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUN9027	14-Aug-90	31616		570		15845	00-Jan-00									pothet1	HP	12305
bayouwq	BUG9025	14-Aug-90	31616		1200		15847	00-Jan-00									pothet1	HP	12293
bayouwq	BUB9505	14-Aug-95	31616		3200		11142	00-Jan-00									9495a	HP	5835
bayouwq	BUC9504	14-Aug-95	31616		710		11142	00-Jan-00									9495a	HP	5837
bayouwq	BUE9509	14-Aug-95	31616		10000		11163	00-Jan-00									9495a	HP	5841
bayouwq	BUA9515	14-Aug-95	31616		5300	BM	11351	00-Jan-00							BM		9495a	HP	5867
bayouwq	BUP9508	14-Aug-95	31616		7600		11353	00-Jan-00									9495a	HP	5863
bayouwq	BUO9507	14-Aug-95	31616		11000		11354	00-Jan-00									9495a	HP	5861
bayouwq	BUM9508	14-Aug-95	31616		7300		11357	00-Jan-00									9495a	HP	5857
bayouwq	BUK9508	14-Aug-95	31616		8000		11359	00-Jan-00									9495a	HP	5853
bayouwq	BUJ9509	14-Aug-95	31616		9400		11360	00-Jan-00									9495a	HP	5851
bayouwq	BUH9509	14-Aug-95	31616		7500		11362	00-Jan-00									9495a	HP	5847
bayouwq	BUF9509	14-Aug-95	31616		7100		11363	00-Jan-00									9495a	HP	5843
bayouwq	BUD9509	14-Aug-95	31616		780		11364	00-Jan-00									9495a	HP	5839
bayouwq	BUW9507	14-Aug-95	31616		11000		15841	00-Jan-00									9495a	HP	5877
bayouwq	BUS9509	14-Aug-95	31616		4000		15843	00-Jan-00									9495a	HP	5869
bayouwq	BUQ9506	14-Aug-95	31616		8500		15844	00-Jan-00									9495a	HP	5865
bayouwq	BUN9508	14-Aug-95	31616		11000		15845	00-Jan-00									9495a	HP	5859
bayouwq	BUL9509	14-Aug-95	31616		6600		15846	00-Jan-00									9495a	HP	5855
bayouwq	BUG9506	14-Aug-95	31616		9600		15847	00-Jan-00									9495a	HP	5845
bayouwq	BUB9606	14-Aug-96	31616		3200		11142	00-Jan-00									bayou95	HP	98
bayouwq	BUC9605	14-Aug-96	31616		710		11142	00-Jan-00									bayou95	HP	99
bayouwq	BUE9613	14-Aug-96	31616		10000		11163	00-Jan-00									bayou95	HP	101
bayouwq	BUA9621	14-Aug-96	31616		5300	BM	11351	00-Jan-00							BM		bayou95	HP	112
bayouwq	BUP9613	14-Aug-96	31616		7600		11353	00-Jan-00									bayou95	HP	110
bayouwq	BUO9613	14-Aug-96	31616		11000		11354	00-Jan-00									bayou95	HP	109
bayouwq	BUM9612	14-Aug-96	31616		7300		11357	00-Jan-00									bayou95	HP	108
bayouwq	BUK9613	14-Aug-96	31616		8000		11359	00-Jan-00									bayou95	HP	106
bayouwq	BUJ9610	14-Aug-96	31616		9400		11360	00-Jan-00									bayou95	HP	105
bayouwq	BUH9613	14-Aug-96	31616		7500		11362	00-Jan-00									bayou95	HP	104
bayouwq	BUF9611	14-Aug-96	31616		7100		11363	00-Jan-00									bayou95	HP	102
bayouwq	BUD9613	14-Aug-96	31616		780		11364	00-Jan-00									bayou95	HP	100
bayouwq	BUW9612	14-Aug-96	31616		11000		15841	00-Jan-00									bayou95	HP	116
bayouwq	BUS9613	14-Aug-96	31616		4000		15843	00-Jan-00									bayou95	HP	113
bayouwq	BUQ9613	14-Aug-96	31616		8500		15844	00-Jan-00									bayou95	HP	111
bayouwq	BUN9613	14-Aug-96	31616		11000		15845	00-Jan-00									bayou95	HP	118
bayouwq	BUL9613	14-Aug-96	31616		6600		15846	00-Jan-00									bayou95	HP	107
bayouwq	BUG9611	14-Aug-96	31616		9600		15847	00-Jan-00									bayou95	HP	103
bayouwq	BUB9202	17-Aug-92	31616		470		11142	00-Jan-00									pbayou	HP	9002
bayouwq	BUE9204	17-Aug-92	31616		1400		11163	00-Jan-00									pbayou	HP	9006
bayouwq	BUV9205	17-Aug-92	31616		1400		11345	00-Jan-00									pbayou	HP	9036
bayouwq	BUA9205	17-Aug-92	31616		950		11351	00-Jan-00									pbayou	HP	9028
bayouwq	BUP9205	17-Aug-92	31616		1200		11353	00-Jan-00									pbayou	HP	9024
bayouwq	BUO9205	17-Aug-92	31616		5000		11354	00-Jan-00									pbayou	HP	9022
bayouwq	BUM9204	17-Aug-92	31616		1100		11357	00-Jan-00									pbayou	HP	9018
bayouwq	BUK9205	17-Aug-92	31616		950		11359	00-Jan-00									pbayou	HP	9014
bayouwq	BUJ9205	17-Aug-92	31616		890		11360	00-Jan-00									pbayou	HP	9012
bayouwq	BUH9205	17-Aug-92	31616		550		11362	00-Jan-00									pbayou	HP	9010
bayouwq	BUD9204	17-Aug-92	31616		520		11364	00-Jan-00									pbayou	HP	9004
bayouwq	BUW9205	17-Aug-92	31616		990		15841	00-Jan-00									pbayou	HP	9038
bayouwq	BUS9205	17-Aug-92	31616		950		15843	00-Jan-00									pbayou	HP	9030
bayouwq	BUQ9202	17-Aug-92	31616		950		15844	00-Jan-00									pbayou	HP	9026
bayouwq	BUN9205	17-Aug-92	31616		1100		15845	00-Jan-00									pbayou	HP	9020
bayouwq	BUL9204	17-Aug-92	31616		1000		15846	00-Jan-00									pbayou	HP	9016
bayouwq	BUG9203	17-Aug-92	31616		720		15847	00-Jan-00									pbayou	HP	9008
bayouwq	BUV9307	17-Aug-93	31616		13000		11345	00-Jan-00									pbayou	HP	9848
bayouwq	BUA9317	17-Aug-93	31616		4000		11351	00-Jan-00									pbayou	HP	9840
bayouwq	BUP9305	17-Aug-93	31616		1600		11353	00-Jan-00									pbayou	HP	9836

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUJ9305	17-Aug-93	31616		11000		11360	00-Jan-00									pbayou	HP	9824
bayouwq	BUD9305	17-Aug-93	31616		2000		11364	00-Jan-00									pbayou	HP	9816
bayouwq	BUW9304	17-Aug-93	31616		4600		15841	00-Jan-00									pbayou	HP	9850
bayouwq	BUN9305	17-Aug-93	31616		4000		15845	00-Jan-00									pbayou	HP	9832
bayouwq	BUL9303	17-Aug-93	31616		30000		15846	00-Jan-00									pbayou	HP	9828
bayouwq	BUA9318	18-Aug-93	31616		4400	BM	11351	00-Jan-00							BM		pbayou	HP	9683
bayouwq	BUB9116	20-Aug-91	31616		1400		11142	00-Jan-00									pbayou	HP	8503
bayouwq	BUE9115	20-Aug-91	31616		1100		11163	00-Jan-00									pbayou	HP	8507
bayouwq	BUA9123	20-Aug-91	31616		9400		11351	00-Jan-00									pbayou	HP	8529
bayouwq	BUP9118	20-Aug-91	31616		710		11353	00-Jan-00									pbayou	HP	8525
bayouwq	BUO9118	20-Aug-91	31616		980		11354	00-Jan-00									pbayou	HP	8523
bayouwq	BUM9116	20-Aug-91	31616		2800		11357	00-Jan-00									pbayou	HP	8519
bayouwq	BUK9119	20-Aug-91	31616		8500		11359	00-Jan-00									pbayou	HP	8515
bayouwq	BUJ9123	20-Aug-91	31616		78000		11360	00-Jan-00									pbayou	HP	8513
bayouwq	BUH9122	20-Aug-91	31616		1100		11362	00-Jan-00									pbayou	HP	8511
bayouwq	BUD9121	20-Aug-91	31616		1200		11364	00-Jan-00									pbayou	HP	8505
bayouwq	BUW9122	20-Aug-91	31616		95000		15841	00-Jan-00									pbayou	HP	8537
bayouwq	BUS9123	20-Aug-91	31616		35000		15843	00-Jan-00									pbayou	HP	8531
bayouwq	BUQ9115	20-Aug-91	31616		10000		15844	00-Jan-00									pbayou	HP	8527
bayouwq	BUN9123	20-Aug-91	31616		980		15845	00-Jan-00									pbayou	HP	8521
bayouwq	BUL9123	20-Aug-91	31616		1200		15846	00-Jan-00									pbayou	HP	8517
bayouwq	BUG9115	20-Aug-91	31616		3300		15847	00-Jan-00									pbayou	HP	8509
bayouwq	BUE9026	21-Aug-90	31616		700		11163	00-Jan-00									pothorl	HP	12364
bayouwq	BUA9028	21-Aug-90	31616		1700		11351	00-Jan-00									pothorl	HP	12386
bayouwq	BUO9025	21-Aug-90	31616		1500		11354	00-Jan-00									pothorl	HP	12380
bayouwq	BUM9026	21-Aug-90	31616		81		11357	00-Jan-00									pothorl	HP	12376
bayouwq	BUK9025	21-Aug-90	31616		3500		11359	00-Jan-00									pothorl	HP	12372
bayouwq	BUJ9026	21-Aug-90	31616		1200		11360	00-Jan-00									pothorl	HP	12370
bayouwq	BUH9026	21-Aug-90	31616		250		11362	00-Jan-00									pothorl	HP	12368
bayouwq	BUW9026	21-Aug-90	31616		2800		15841	00-Jan-00									pothorl	HP	12394
bayouwq	BUS9026	21-Aug-90	31616		3100		15843	00-Jan-00									pothorl	HP	12388
bayouwq	BUQ9026	21-Aug-90	31616		3200		15844	00-Jan-00									pothorl	HP	12384
bayouwq	BUN9028	21-Aug-90	31616		1100		15845	00-Jan-00									pothorl	HP	12378
bayouwq	BUL9024	21-Aug-90	31616		4200		15846	00-Jan-00									pothorl	HP	12374
bayouwq	BUG9026	21-Aug-90	31616		6600		15847	00-Jan-00									pothorl	HP	12366
bayouwq	BUA9319	25-Aug-93	31616		15000	BM	11351	00-Jan-00							BM		pbayou	HP	9729
bayouwq	BUB9117	26-Aug-91	31616		140		11142	00-Jan-00									pbayou	HP	8573
bayouwq	BUE9116	26-Aug-91	31616		140		11163	00-Jan-00									pbayou	HP	8577
bayouwq	BUV9104	26-Aug-91	31616		950		11345	00-Jan-00									pbayou	HP	8607
bayouwq	BUA9124	26-Aug-91	31616		740		11351	00-Jan-00									pbayou	HP	8599
bayouwq	BUP9119	26-Aug-91	31616		1100		11353	00-Jan-00									pbayou	HP	8595
bayouwq	BUO9119	26-Aug-91	31616		860		11354	00-Jan-00									pbayou	HP	8593
bayouwq	BUM9117	26-Aug-91	31616		810		11357	00-Jan-00									pbayou	HP	8589
bayouwq	BUK9120	26-Aug-91	31616		3000		11359	00-Jan-00									pbayou	HP	8585
bayouwq	BUJ9124	26-Aug-91	31616		920		11360	00-Jan-00									pbayou	HP	8583
bayouwq	BUH9123	26-Aug-91	31616		920		11362	00-Jan-00									pbayou	HP	8581
bayouwq	BUD9122	26-Aug-91	31616		690		11364	00-Jan-00									pbayou	HP	8575
bayouwq	BUW9123	26-Aug-91	31616		380		15841	00-Jan-00									pbayou	HP	8609
bayouwq	BUS9124	26-Aug-91	31616		640		15843	00-Jan-00									pbayou	HP	8601
bayouwq	BUQ9116	26-Aug-91	31616		960		15844	00-Jan-00									pbayou	HP	8597
bayouwq	BUN9124	26-Aug-91	31616		500		15845	00-Jan-00									pbayou	HP	8591
bayouwq	BUL9124	26-Aug-91	31616		730		15846	00-Jan-00									pbayou	HP	8587
bayouwq	BUG9116	26-Aug-91	31616		91		15847	00-Jan-00									pbayou	HP	8579
bayouwq	BUB9026	28-Aug-90	31616		1100		11142	00-Jan-00									pothorl	HP	12433
bayouwq	BUE9027	28-Aug-90	31616		400		11163	00-Jan-00									pothorl	HP	12437
bayouwq	BUA9029	28-Aug-90	31616		5200		11351	00-Jan-00									pothorl	HP	12459
bayouwq	BUP9003	28-Aug-90	31616		2400		11353	00-Jan-00									pothorl	HP	12455
bayouwq	BUO9026	28-Aug-90	31616		4400		11354	00-Jan-00									pothorl	HP	12453

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUM9027	28-Aug-90	31616		9700		11357	00-Jan-00									poth1	HP	12449
bayouwq	BUK9026	28-Aug-90	31616		7400		11359	00-Jan-00									poth1	HP	12445
bayouwq	BUJ9027	28-Aug-90	31616		940		11360	00-Jan-00									poth1	HP	12443
bayouwq	BUH9027	28-Aug-90	31616		1300		11362	00-Jan-00									poth1	HP	12441
bayouwq	BUD9026	28-Aug-90	31616		920		11364	00-Jan-00									poth1	HP	12435
bayouwq	BUW9027	28-Aug-90	31616		9300		15841	00-Jan-00									poth1	HP	12467
bayouwq	BUU9024	28-Aug-90	31616		100000		15842	00-Jan-00									poth1	HP	12465
bayouwq	BUS9027	28-Aug-90	31616		8500		15843	00-Jan-00									poth1	HP	12461
bayouwq	BUQ9027	28-Aug-90	31616		8700		15844	00-Jan-00									poth1	HP	12457
bayouwq	BUN9029	28-Aug-90	31616		2900		15845	00-Jan-00									poth1	HP	12451
bayouwq	BUL9025	28-Aug-90	31616		9		15846	00-Jan-00									poth1	HP	12447
bayouwq	BUG9027	28-Aug-90	31616		7500		15847	00-Jan-00									poth1	HP	12439
bayouwq	BUA8505	29-Aug-85	31616		36500		11351	00-Jan-00									poth1	HP	9502
bayouwq	BUO8505	29-Aug-85	31616		17000		11354	00-Jan-00									poth1	HP	9500
bayouwq	BUM8507	29-Aug-85	31616		58000		11357	00-Jan-00									poth1	HP	9497
bayouwq	BUK8507	29-Aug-85	31616		210		11359	00-Jan-00									poth1	HP	9495
bayouwq	BUI8501	29-Aug-85	31616		2240		11361	00-Jan-00									poth1	HP	9493
bayouwq	BUH8507	29-Aug-85	31616		790		11362	00-Jan-00									poth1	HP	9492
bayouwq	BUX8507	29-Aug-85	31616		5030		15840	00-Jan-00									poth1	HP	9511
bayouwq	BUW8507	29-Aug-85	31616		3700		15841	00-Jan-00									poth1	HP	9508
bayouwq	BUU8507	29-Aug-85	31616		37100		15842	00-Jan-00									poth1	HP	9506
bayouwq	BUS8507	29-Aug-85	31616		48000		15843	00-Jan-00									poth1	HP	9505
bayouwq	BUN8503	29-Aug-85	31616		2700		15845	00-Jan-00									poth1	HP	9498
bayouwq	BUL8504	29-Aug-85	31616		1500		15846	00-Jan-00									poth1	HP	9496
bayouwq	BUA9206	31-Aug-92	31616		7100		11351	00-Jan-00									phayou	HP	9511
bayouwq	BUB8805	01-Sep-88	31616		12300		11142	00-Jan-00									poth1	HP	9940
bayouwq	BUA8805	01-Sep-88	31616		120000		11351	00-Jan-00									poth1	HP	9948
bayouwq	BUO8805	01-Sep-88	31616		7100		11354	00-Jan-00									poth1	HP	9947
bayouwq	BUM8805	01-Sep-88	31616		2800		11357	00-Jan-00									poth1	HP	9946
bayouwq	BUJ8805	01-Sep-88	31616		10		11360	00-Jan-00									poth1	HP	9944
bayouwq	BUH8805	01-Sep-88	31616		3900		11362	00-Jan-00									poth1	HP	9943
bayouwq	BUD8805	01-Sep-88	31616		10800		11364	00-Jan-00									poth1	HP	9941
bayouwq	BUX8805	01-Sep-88	31616		114000		15840	00-Jan-00									poth1	HP	9953
bayouwq	BUW8805	01-Sep-88	31616		4100		15841	00-Jan-00									poth1	HP	9952
bayouwq	BUS8805	01-Sep-88	31616		23000		15843	00-Jan-00									poth1	HP	9949
bayouwq	BUL8805	01-Sep-88	31616		410		15846	00-Jan-00									poth1	HP	9945
bayouwq	BUG8805	01-Sep-88	31616		3100		15847	00-Jan-00									poth1	HP	9942
bayouwq	BUV8304	04-Sep-83	31616		4000		11345	00-Jan-00									poth1	HP	9060
bayouwq	BUA8305	04-Sep-83	31616		1		11351	00-Jan-00									poth1	HP	9055
bayouwq	BUO8305	04-Sep-83	31616		1		11354	00-Jan-00									poth1	HP	9053
bayouwq	BUM8306	04-Sep-83	31616		6000		11357	00-Jan-00									poth1	HP	9050
bayouwq	BUJ8306	04-Sep-83	31616		1000		11360	00-Jan-00									poth1	HP	9047
bayouwq	BUH8306	04-Sep-83	31616		1		11362	00-Jan-00									poth1	HP	9045
bayouwq	BUX8304	04-Sep-83	31616		2000		15840	00-Jan-00									poth1	HP	9064
bayouwq	BUW8304	04-Sep-83	31616		6000		15841	00-Jan-00									poth1	HP	9061
bayouwq	BUS8304	04-Sep-83	31616		4000		15843	00-Jan-00									poth1	HP	9058
bayouwq	BUB9027	04-Sep-90	31616		14000		11142	00-Jan-00									poth1	HP	12506
bayouwq	BUE9028	04-Sep-90	31616		1800		11163	00-Jan-00									poth1	HP	12510
bayouwq	BUA9030	04-Sep-90	31616		2900		11351	00-Jan-00									poth1	HP	12532
bayouwq	BUP9004	04-Sep-90	31616		1500		11353	00-Jan-00									poth1	HP	12528
bayouwq	BUO9027	04-Sep-90	31616		1700		11354	00-Jan-00									poth1	HP	12526
bayouwq	BUM9028	04-Sep-90	31616		18		11357	00-Jan-00									poth1	HP	12522
bayouwq	BUK9027	04-Sep-90	31616		28000		11359	00-Jan-00									poth1	HP	12518
bayouwq	BUJ9028	04-Sep-90	31616		300		11360	00-Jan-00									poth1	HP	12516
bayouwq	BUH9028	04-Sep-90	31616		1400		11362	00-Jan-00									poth1	HP	12514
bayouwq	BUD9027	04-Sep-90	31616		20000		11364	00-Jan-00									poth1	HP	12508
bayouwq	BUW9028	04-Sep-90	31616		2000		15841	00-Jan-00									poth1	HP	12540
bayouwq	BUU9025	04-Sep-90	31616		7300		15842	00-Jan-00									poth1	HP	12538

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUS9028	04-Sep-90	31616		4000		15843	00-Jan-00									poth1	HP	12534
bayouwq	BUQ9028	04-Sep-90	31616		5900		15844	00-Jan-00									poth1	HP	12530
bayouwq	BUN9030	04-Sep-90	31616		3700		15845	00-Jan-00									poth1	HP	12524
bayouwq	BUL9026	04-Sep-90	31616		29000		15846	00-Jan-00									poth1	HP	12520
bayouwq	BUG9028	04-Sep-90	31616		17000		15847	00-Jan-00									poth1	HP	12512
bayouwq	BUB9415	06-Sep-94	31616		520		11142	00-Jan-00									9495a	HP	1900
bayouwq	BUC9413	06-Sep-94	31616		5800		11142	00-Jan-00									9495a	HP	1902
bayouwq	BUE9415	06-Sep-94	31616		640		11163	00-Jan-00									9495a	HP	1906
bayouwq	BUV9415	06-Sep-94	31616		310		11345	00-Jan-00									9495a	HP	1932
bayouwq	BUA9417	06-Sep-94	31616		950	BM	11351	00-Jan-00							BM		9495a	HP	1926
bayouwq	BUP9415	06-Sep-94	31616		750		11353	00-Jan-00									9495a	HP	1924
bayouwq	BUO9415	06-Sep-94	31616		480		11354	00-Jan-00									9495a	HP	1922
bayouwq	BUM9415	06-Sep-94	31616		770		11357	00-Jan-00									9495a	HP	1918
bayouwq	BUK9415	06-Sep-94	31616		3900		11359	00-Jan-00									9495a	HP	1914
bayouwq	BUI9410	06-Sep-94	31616		4700		11361	00-Jan-00									9495a	HP	1912
bayouwq	BUH9415	06-Sep-94	31616		4800		11362	00-Jan-00									9495a	HP	1910
bayouwq	BUF9410	06-Sep-94	31616		560		11363	00-Jan-00									9495a	HP	1908
bayouwq	BUD9415	06-Sep-94	31616		490		11364	00-Jan-00									9495a	HP	1904
bayouwq	BUW9412	06-Sep-94	31616		2300		15841	00-Jan-00									9495a	HP	1934
bayouwq	BUS9415	06-Sep-94	31616		2600		15843	00-Jan-00									9495a	HP	1928
bayouwq	BUN9415	06-Sep-94	31616		2300		15845	00-Jan-00									9495a	HP	1920
bayouwq	BUL9415	06-Sep-94	31616		2900		15846	00-Jan-00									9495a	HP	1916
bayouwq	BUB9607	06-Sep-96	31616		2400		11142	00-Jan-00									xls96	HP	2238
bayouwq	BUC9606	06-Sep-96	31616		340		11142	00-Jan-00									xls96	HP	2239
bayouwq	BUE9614	06-Sep-96	31616		1400		11163	00-Jan-00									xls96	HP	2241
bayouwq	BUA9622	06-Sep-96	31616		2000	QC	11351	00-Jan-00							QC		xls96	HP	2237
bayouwq	BUP9614	06-Sep-96	31616		1200		11353	00-Jan-00									xls96	HP	2252
bayouwq	BUO9614	06-Sep-96	31616		490		11354	00-Jan-00									xls96	HP	2251
bayouwq	BUM9613	06-Sep-96	31616		4500		11357	00-Jan-00									xls96	HP	2249
bayouwq	BUK9614	06-Sep-96	31616		140		11359	00-Jan-00									xls96	HP	2247
bayouwq	BUJ9611	06-Sep-96	31616		9		11360	00-Jan-00									xls96	HP	2246
bayouwq	BUI9613	06-Sep-96	31616		330		11361	00-Jan-00									xls96	HP	2245
bayouwq	BUH9614	06-Sep-96	31616		310		11362	00-Jan-00									xls96	HP	2244
bayouwq	BUF9612	06-Sep-96	31616		920		11363	00-Jan-00									xls96	HP	2242
bayouwq	BUD9614	06-Sep-96	31616		680		11364	00-Jan-00									xls96	HP	2240
bayouwq	BUS9614	06-Sep-96	31616		8200		15843	00-Jan-00									xls96	HP	2255
bayouwq	BUQ9614	06-Sep-96	31616		1600		15844	00-Jan-00									xls96	HP	2253
bayouwq	BUN9614	06-Sep-96	31616		1200		15845	00-Jan-00									xls96	HP	2250
bayouwq	BUL9614	06-Sep-96	31616		72		15846	00-Jan-00									xls96	HP	2248
bayouwq	BUG9612	06-Sep-96	31616		350		15847	00-Jan-00									xls96	HP	2243
bayouwq	BUA8605	08-Sep-86	31616		3990		11351	00-Jan-00									poth1	HP	9694
bayouwq	BUO8605	08-Sep-86	31616		6700		11354	00-Jan-00									poth1	HP	9692
bayouwq	BUM8605	08-Sep-86	31616		1		11357	00-Jan-00									poth1	HP	9689
bayouwq	BUJ8605	08-Sep-86	31616		730		11360	00-Jan-00									poth1	HP	9686
bayouwq	BUH8605	08-Sep-86	31616		2050		11362	00-Jan-00									poth1	HP	9684
bayouwq	BUD8603	08-Sep-86	31616		4020		11364	00-Jan-00									poth1	HP	9682
bayouwq	BUX8605	08-Sep-86	31616		760		15840	00-Jan-00									poth1	HP	9703
bayouwq	BUW8605	08-Sep-86	31616		1070		15841	00-Jan-00									poth1	HP	9700
bayouwq	BUU8605	08-Sep-86	31616		1990		15842	00-Jan-00									poth1	HP	9698
bayouwq	BUS8605	08-Sep-86	31616		4150		15843	00-Jan-00									poth1	HP	9697
bayouwq	BUL8605	08-Sep-86	31616		1		15846	00-Jan-00									poth1	HP	9688
bayouwq	BUG8602	08-Sep-86	31616		2730		15847	00-Jan-00									poth1	HP	9683
bayouwq	BUB9118	09-Sep-91	31616		160		11142	00-Jan-00									pbayou	HP	10222
bayouwq	BUE9117	09-Sep-91	31616		3600		11163	00-Jan-00									pbayou	HP	10226
bayouwq	BUV9105	09-Sep-91	31616		4000		11345	00-Jan-00									pbayou	HP	10256
bayouwq	BUA9125	09-Sep-91	31616		2300		11351	00-Jan-00									pbayou	HP	10248
bayouwq	BUP9120	09-Sep-91	31616		820		11353	00-Jan-00									pbayou	HP	10244
bayouwq	BUO9120	09-Sep-91	31616		670		11354	00-Jan-00									pbayou	HP	10242

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUM9118	09-Sep-91	31616		1300		11357	00-Jan-00									pbayou	HP	10238
bayouwq	BUK9121	09-Sep-91	31616		1400		11359	00-Jan-00									pbayou	HP	10234
bayouwq	BUJ9125	09-Sep-91	31616		1300		11360	00-Jan-00									pbayou	HP	10232
bayouwq	BUH9124	09-Sep-91	31616		1500		11362	00-Jan-00									pbayou	HP	10230
bayouwq	BUD9123	09-Sep-91	31616		310		11364	00-Jan-00									pbayou	HP	10224
bayouwq	BUX9106	09-Sep-91	31616		880		15840	00-Jan-00									pbayou	HP	10262
bayouwq	BUW9124	09-Sep-91	31616		5600		15841	00-Jan-00									pbayou	HP	10258
bayouwq	BUU9113	09-Sep-91	31616		4700		15842	00-Jan-00									pbayou	HP	10254
bayouwq	BUS9125	09-Sep-91	31616		1900		15843	00-Jan-00									pbayou	HP	10250
bayouwq	BUQ9117	09-Sep-91	31616		1100		15844	00-Jan-00									pbayou	HP	10246
bayouwq	BUN9125	09-Sep-91	31616		860		15845	00-Jan-00									pbayou	HP	10240
bayouwq	BUL9125	09-Sep-91	31616		1500		15846	00-Jan-00									pbayou	HP	10236
bayouwq	BUG9117	09-Sep-91	31616		7500		15847	00-Jan-00									pbayou	HP	10228
bayouwq	BUA9207	10-Sep-92	31616		5100		11351	00-Jan-00									pbayou	HP	11032
bayouwq	BUV9615	10-Sep-96	31616		570		11345	00-Jan-00									xls96	HP	2270
bayouwq	BUX9614	10-Sep-96	31616		2100		15840	00-Jan-00									xls96	HP	2272
bayouwq	BUW9613	10-Sep-96	31616		240		15841	00-Jan-00									xls96	HP	2271
bayouwq	BUB9506	12-Sep-95	31616		58000		11142	00-Jan-00									9495b	HP	48
bayouwq	BUC9505	12-Sep-95	31616		1600		11142	00-Jan-00									9495b	HP	49
bayouwq	BUE9510	12-Sep-95	31616		800		11163	00-Jan-00									9495b	HP	51
bayouwq	BUV9512	12-Sep-95	31616		200000		11345	00-Jan-00									9495b	HP	65
bayouwq	BUA9516	12-Sep-95	31616		95000	BM	11351	00-Jan-00							BM		9495b	HP	62
bayouwq	BUP9509	12-Sep-95	31616		99000		11353	00-Jan-00									9495b	HP	60
bayouwq	BUO9508	12-Sep-95	31616		6500		11354	00-Jan-00									9495b	HP	59
bayouwq	BUM9509	12-Sep-95	31616		5000		11357	00-Jan-00									9495b	HP	58
bayouwq	BUK9509	12-Sep-95	31616		7300		11359	00-Jan-00									9495b	HP	56
bayouwq	BUJ9510	12-Sep-95	31616		7300		11360	00-Jan-00									9495b	HP	55
bayouwq	BUH9510	12-Sep-95	31616		7000		11362	00-Jan-00									9495b	HP	54
bayouwq	BUF9510	12-Sep-95	31616		770		11363	00-Jan-00									9495b	HP	52
bayouwq	BUD9510	12-Sep-95	31616		1200		11364	00-Jan-00									9495b	HP	50
bayouwq	BUX9504	12-Sep-95	31616		200000		15840	00-Jan-00									9495b	HP	67
bayouwq	BUW9508	12-Sep-95	31616		60000		15841	00-Jan-00									9495b	HP	66
bayouwq	BUS9510	12-Sep-95	31616		99000		15843	00-Jan-00									9495b	HP	63
bayouwq	BUQ9507	12-Sep-95	31616		89000		15844	00-Jan-00									9495b	HP	61
bayouwq	BUN9509	12-Sep-95	31616		24000		15845	00-Jan-00									9495b	HP	68
bayouwq	BUL9510	12-Sep-95	31616		5500		15846	00-Jan-00									9495b	HP	57
bayouwq	BUG9507	12-Sep-95	31616		880		15847	00-Jan-00									9495b	HP	53
bayouwq	BUB9608	12-Sep-96	31616		58000		11142	00-Jan-00									bayou95	HP	171
bayouwq	BUC9607	12-Sep-96	31616		1600		11142	00-Jan-00									bayou95	HP	172
bayouwq	BUE9615	12-Sep-96	31616		800		11163	00-Jan-00									bayou95	HP	174
bayouwq	BUV9616	12-Sep-96	31616		200000		11345	00-Jan-00									bayou95	HP	188
bayouwq	BUA9623	12-Sep-96	31616		95000	BM	11351	00-Jan-00							BM		bayou95	HP	185
bayouwq	BUP9615	12-Sep-96	31616		99000		11353	00-Jan-00									bayou95	HP	183
bayouwq	BUO9615	12-Sep-96	31616		6500		11354	00-Jan-00									bayou95	HP	182
bayouwq	BUM9614	12-Sep-96	31616		5000		11357	00-Jan-00									bayou95	HP	181
bayouwq	BUK9615	12-Sep-96	31616		7300		11359	00-Jan-00									bayou95	HP	179
bayouwq	BUJ9612	12-Sep-96	31616		7300		11360	00-Jan-00									bayou95	HP	178
bayouwq	BUH9615	12-Sep-96	31616		7000		11362	00-Jan-00									bayou95	HP	177
bayouwq	BUF9613	12-Sep-96	31616		770		11363	00-Jan-00									bayou95	HP	175
bayouwq	BUD9615	12-Sep-96	31616		1200		11364	00-Jan-00									bayou95	HP	173
bayouwq	BUX9615	12-Sep-96	31616		200000		15840	00-Jan-00									bayou95	HP	190
bayouwq	BUW9614	12-Sep-96	31616		60000		15841	00-Jan-00									bayou95	HP	189
bayouwq	BUS9615	12-Sep-96	31616		99000		15843	00-Jan-00									bayou95	HP	186
bayouwq	BUQ9615	12-Sep-96	31616		89000		15844	00-Jan-00									bayou95	HP	184
bayouwq	BUN9615	12-Sep-96	31616		24000		15845	00-Jan-00									bayou95	HP	191
bayouwq	BUL9615	12-Sep-96	31616		5500		15846	00-Jan-00									bayou95	HP	180
bayouwq	BUG9613	12-Sep-96	31616		880		15847	00-Jan-00									bayou95	HP	176
bayouwq	BUA8405	18-Sep-84	31616		21000		11351	00-Jan-00									pother1	HP	9278

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUO8404	18-Sep-84	31616		36200		11354	00-Jan-00									pothor1	HP	9276
bayouwq	BUM8405	18-Sep-84	31616		13000		11357	00-Jan-00									pothor1	HP	9273
bayouwq	BUJ8405	18-Sep-84	31616		1		11360	00-Jan-00									pothor1	HP	9270
bayouwq	BUH8404	18-Sep-84	31616		1300		11362	00-Jan-00									pothor1	HP	9268
bayouwq	BUS8405	18-Sep-84	31616		19800		15843	00-Jan-00									pothor1	HP	9281
bayouwq	BUB9203	22-Sep-92	31616		1400		11142	00-Jan-00									pbayou	HP	10737
bayouwq	BUE9205	22-Sep-92	31616		1400		11163	00-Jan-00									pbayou	HP	10741
bayouwq	BUV9206	22-Sep-92	31616		3700		11345	00-Jan-00									pbayou	HP	10771
bayouwq	BUA9208	22-Sep-92	31616		1300		11351	00-Jan-00									pbayou	HP	10763
bayouwq	BUP9206	22-Sep-92	31616		480		11353	00-Jan-00									pbayou	HP	10759
bayouwq	BUO9206	22-Sep-92	31616		2000		11354	00-Jan-00									pbayou	HP	10757
bayouwq	BUM9205	22-Sep-92	31616		1900		11357	00-Jan-00									pbayou	HP	10753
bayouwq	BUJ9206	22-Sep-92	31616		1800		11360	00-Jan-00									pbayou	HP	10747
bayouwq	BUH9206	22-Sep-92	31616		2900		11362	00-Jan-00									pbayou	HP	10745
bayouwq	BUD9205	22-Sep-92	31616		1700		11364	00-Jan-00									pbayou	HP	10739
bayouwq	BUW9206	22-Sep-92	31616		2900		15841	00-Jan-00									pbayou	HP	10773
bayouwq	BUS9206	22-Sep-92	31616		2700		15843	00-Jan-00									pbayou	HP	10765
bayouwq	BUQ9203	22-Sep-92	31616		1300		15844	00-Jan-00									pbayou	HP	10761
bayouwq	BUN9206	22-Sep-92	31616		1500		15845	00-Jan-00									pbayou	HP	10755
bayouwq	BUL9205	22-Sep-92	31616		1500		15846	00-Jan-00									pbayou	HP	10751
bayouwq	BUG9204	22-Sep-92	31616		1700		15847	00-Jan-00									pbayou	HP	10743
bayouwq	BUA9209	24-Sep-92	31616		3900		11351	00-Jan-00									pbayou	HP	11090
bayouwq	BUA9031	25-Sep-90	31616		9100		11351	00-Jan-00									pothor1	HP	12605
bayouwq	BUO9028	25-Sep-90	31616		3100		11354	00-Jan-00									pothor1	HP	12599
bayouwq	BUK9028	25-Sep-90	31616		1200		11359	00-Jan-00									pothor1	HP	12591
bayouwq	BUJ9029	25-Sep-90	31616		90		11360	00-Jan-00									pothor1	HP	12589
bayouwq	BUD9028	25-Sep-90	31616		1900		11364	00-Jan-00									pothor1	HP	12581
bayouwq	BUW9029	25-Sep-90	31616		38000		15841	00-Jan-00									pothor1	HP	12613
bayouwq	BUS9029	25-Sep-90	31616		15000		15843	00-Jan-00									pothor1	HP	12607
bayouwq	BUN9031	25-Sep-90	31616		930		15845	00-Jan-00									pothor1	HP	12597
bayouwq	BUL9027	25-Sep-90	31616		330		15846	00-Jan-00									pothor1	HP	12593
bayouwq	BUB9119	26-Sep-91	31616		7300		11142	00-Jan-00									pbayou	HP	10303
bayouwq	BUE9118	26-Sep-91	31616		8700		11163	00-Jan-00									pbayou	HP	10307
bayouwq	BUV9106	26-Sep-91	31616		5700		11345	00-Jan-00									pbayou	HP	10337
bayouwq	BUA9126	26-Sep-91	31616		13000		11351	00-Jan-00									pbayou	HP	10329
bayouwq	BUP9121	26-Sep-91	31616		11000		11353	00-Jan-00									pbayou	HP	10325
bayouwq	BUO9121	26-Sep-91	31616		8400		11354	00-Jan-00									pbayou	HP	10323
bayouwq	BUM9119	26-Sep-91	31616		11000		11357	00-Jan-00									pbayou	HP	10319
bayouwq	BUK9122	26-Sep-91	31616		9800		11359	00-Jan-00									pbayou	HP	10315
bayouwq	BUJ9126	26-Sep-91	31616		12000		11360	00-Jan-00									pbayou	HP	10313
bayouwq	BUH9125	26-Sep-91	31616		7300		11362	00-Jan-00									pbayou	HP	10311
bayouwq	BUD9124	26-Sep-91	31616		11000		11364	00-Jan-00									pbayou	HP	10305
bayouwq	BUU9114	26-Sep-91	31616		4900		15842	00-Jan-00									pbayou	HP	10335
bayouwq	BUS9126	26-Sep-91	31616		14000		15843	00-Jan-00									pbayou	HP	10331
bayouwq	BUQ9118	26-Sep-91	31616		9100		15844	00-Jan-00									pbayou	HP	10327
bayouwq	BUN9126	26-Sep-91	31616		12000		15845	00-Jan-00									pbayou	HP	10321
bayouwq	BUL9126	26-Sep-91	31616		7900		15846	00-Jan-00									pbayou	HP	10317
bayouwq	BUG9118	26-Sep-91	31616		7500		15847	00-Jan-00									pbayou	HP	10309
bayouwq	BUA9624	26-Sep-96	31616		9200	BM	11351	00-Jan-00							BM		bayou95	HP	322
bayouwq	BUB9416	27-Sep-94	31616		590		11142	00-Jan-00									9495a	HP	2022
bayouwq	BUC9414	27-Sep-94	31616		470		11142	00-Jan-00									9495a	HP	2024
bayouwq	BUE9416	27-Sep-94	31616		1100		11163	00-Jan-00									9495a	HP	2028
bayouwq	BUV9416	27-Sep-94	31616		5400		11345	00-Jan-00									9495a	HP	2056
bayouwq	BUA9418	27-Sep-94	31616		4600	BM	11351	00-Jan-00							BM		9495a	HP	2050
bayouwq	BUP9416	27-Sep-94	31616		2300		11353	00-Jan-00									9495a	HP	2048
bayouwq	BUO9416	27-Sep-94	31616		2200		11354	00-Jan-00									9495a	HP	2046
bayouwq	BUM9416	27-Sep-94	31616		740		11357	00-Jan-00									9495a	HP	2042
bayouwq	BUK9416	27-Sep-94	31616		4000		11359	00-Jan-00									9495a	HP	2038

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUJ9414	27-Sep-94	31616		20000		11360	00-Jan-00									9495a	HP	2036
bayouwq	BUJ9411	27-Sep-94	31616		8600		11361	00-Jan-00									9495a	HP	2034
bayouwq	BUH9416	27-Sep-94	31616		8900		11362	00-Jan-00									9495a	HP	2032
bayouwq	BUF9411	27-Sep-94	31616		630		11363	00-Jan-00									9495a	HP	2030
bayouwq	BUD9416	27-Sep-94	31616		570		11364	00-Jan-00									9495a	HP	2026
bayouwq	BUW9413	27-Sep-94	31616		2300		15841	00-Jan-00									9495a	HP	2058
bayouwq	BUS9416	27-Sep-94	31616		480		15843	00-Jan-00									9495a	HP	2052
bayouwq	BUN9416	27-Sep-94	31616		3400		15845	00-Jan-00									9495a	HP	2044
bayouwq	BUL9416	27-Sep-94	31616		810		15846	00-Jan-00									9495a	HP	2040
bayouwq	BUB9609	27-Sep-96	31616		4400		11142	00-Jan-00									bayou95	HP	339
bayouwq	BUC9608	27-Sep-96	31616		4400		11142	00-Jan-00									bayou95	HP	340
bayouwq	BUE9616	27-Sep-96	31616		2900		11163	00-Jan-00									bayou95	HP	342
bayouwq	BUV9617	27-Sep-96	31616		5800		11345	00-Jan-00									bayou95	HP	357
bayouwq	BUA9625	27-Sep-96	31616		11000	BM	11351	00-Jan-00							BM		bayou95	HP	353
bayouwq	BUP9616	27-Sep-96	31616		2600		11353	00-Jan-00									bayou95	HP	351
bayouwq	BUO9616	27-Sep-96	31616		3900		11354	00-Jan-00									bayou95	HP	350
bayouwq	BUM9615	27-Sep-96	31616		5900		11357	00-Jan-00									bayou95	HP	349
bayouwq	BUK9616	27-Sep-96	31616		6600		11359	00-Jan-00									bayou95	HP	347
bayouwq	BUJ9613	27-Sep-96	31616		7500		11360	00-Jan-00									bayou95	HP	346
bayouwq	BUJ9614	27-Sep-96	31616		7800		11361	00-Jan-00									bayou95	HP	360
bayouwq	BUH9616	27-Sep-96	31616		3300		11362	00-Jan-00									bayou95	HP	345
bayouwq	BUF9614	27-Sep-96	31616		2600		11363	00-Jan-00									bayou95	HP	343
bayouwq	BUD9616	27-Sep-96	31616		4100		11364	00-Jan-00									bayou95	HP	341
bayouwq	BUX9616	27-Sep-96	31616		4000		15840	00-Jan-00									bayou95	HP	359
bayouwq	BUW9615	27-Sep-96	31616		3700		15841	00-Jan-00									bayou95	HP	358
bayouwq	BUU9602	27-Sep-96	31616		6700		15842	00-Jan-00									bayou95	HP	355
bayouwq	BUS9616	27-Sep-96	31616		20000		15843	00-Jan-00									bayou95	HP	354
bayouwq	BUQ9616	27-Sep-96	31616		1600		15844	00-Jan-00									bayou95	HP	352
bayouwq	BUN9616	27-Sep-96	31616		5500		15845	00-Jan-00									bayou95	HP	361
bayouwq	BUL9616	27-Sep-96	31616		5300		15846	00-Jan-00									bayou95	HP	348
bayouwq	BUG9614	27-Sep-96	31616		2300		15847	00-Jan-00									bayou95	HP	344
bayouwq	BUA9210	01-Oct-92	31616		5300		11351	00-Jan-00									pbayou	HP	12105
bayouwq	BUB9028	02-Oct-90	31616		8600		11142	00-Jan-00									pothor1	HP	12652
bayouwq	BUE9029	02-Oct-90	31616		1200		11163	00-Jan-00									pothor1	HP	12656
bayouwq	BUA9032	02-Oct-90	31616		7200		11351	00-Jan-00									pothor1	HP	3593
bayouwq	BUP9005	02-Oct-90	31616		3700		11353	00-Jan-00									pothor1	HP	12674
bayouwq	BUO9029	02-Oct-90	31616		8100		11354	00-Jan-00									pothor1	HP	12672
bayouwq	BUM9029	02-Oct-90	31616		910		11357	00-Jan-00									pothor1	HP	12668
bayouwq	BUK9029	02-Oct-90	31616		400		11359	00-Jan-00									pothor1	HP	12664
bayouwq	BUJ9030	02-Oct-90	31616		9		11360	00-Jan-00									pothor1	HP	12662
bayouwq	BUH9029	02-Oct-90	31616		1000		11362	00-Jan-00									pothor1	HP	12660
bayouwq	BUD9029	02-Oct-90	31616		1100		11364	00-Jan-00									pothor1	HP	12654
bayouwq	BUW9030	02-Oct-90	31616		81000		15841	00-Jan-00									pothor1	HP	3601
bayouwq	BUU9026	02-Oct-90	31616		9000		15842	00-Jan-00									pothor1	HP	3599
bayouwq	BUS9030	02-Oct-90	31616		6300		15843	00-Jan-00									pothor1	HP	3595
bayouwq	BUQ9029	02-Oct-90	31616		6900		15844	00-Jan-00									pothor1	HP	12676
bayouwq	BUN9032	02-Oct-90	31616		1400		15845	00-Jan-00									pothor1	HP	12670
bayouwq	BUL9028	02-Oct-90	31616		390		15846	00-Jan-00									pothor1	HP	12666
bayouwq	BUG9029	02-Oct-90	31616		13000		15847	00-Jan-00									pothor1	HP	12658
bayouwq	BUC9301	05-Oct-93	31616		450		11142	00-Jan-00									pbayou	HP	12463
bayouwq	BUE9303	05-Oct-93	31616		70		11163	00-Jan-00									pbayou	HP	12467
bayouwq	BUV9308	05-Oct-93	31616		3300		11345	00-Jan-00									pbayou	HP	12497
bayouwq	BUA9320	05-Oct-93	31616		560		11351	00-Jan-00									pbayou	HP	12489
bayouwq	BUP9306	05-Oct-93	31616		2400		11353	00-Jan-00									pbayou	HP	12485
bayouwq	BUO9304	05-Oct-93	31616		3900		11354	00-Jan-00									pbayou	HP	12483
bayouwq	BUM9303	05-Oct-93	31616		10000		11357	00-Jan-00									pbayou	HP	12479
bayouwq	BUK9303	05-Oct-93	31616		770		11359	00-Jan-00									pbayou	HP	12475
bayouwq	BUJ9306	05-Oct-93	31616		600		11360	00-Jan-00									pbayou	HP	12473

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUH9304	05-Oct-93	31616		6400		11362	00-Jan-00									pbayou	HP	12471
bayouwq	BUD9306	05-Oct-93	31616		1100		11364	00-Jan-00									pbayou	HP	12465
bayouwq	BUW9305	05-Oct-93	31616		2500		15841	00-Jan-00									pbayou	HP	12499
bayouwq	BUS9306	05-Oct-93	31616		4000		15843	00-Jan-00									pbayou	HP	12491
bayouwq	BUN9306	05-Oct-93	31616		5200		15845	00-Jan-00									pbayou	HP	12481
bayouwq	BUL9304	05-Oct-93	31616		1300		15846	00-Jan-00									pbayou	HP	12477
bayouwq	BUG9303	05-Oct-93	31616		27		15847	00-Jan-00									pbayou	HP	12469
bayouwq	BUB9120	07-Oct-91	31616		2000		11142	00-Jan-00									pbayou	HP	11251
bayouwq	BUE9119	07-Oct-91	31616		180		11163	00-Jan-00									pbayou	HP	11255
bayouwq	BUV9107	07-Oct-91	31616		3800		11345	00-Jan-00									pbayou	HP	11285
bayouwq	BUA9127	07-Oct-91	31616		640		11351	00-Jan-00									pbayou	HP	11277
bayouwq	BUP9122	07-Oct-91	31616		330		11353	00-Jan-00									pbayou	HP	11273
bayouwq	BUO9122	07-Oct-91	31616		490		11354	00-Jan-00									pbayou	HP	11271
bayouwq	BUM9120	07-Oct-91	31616		250		11357	00-Jan-00									pbayou	HP	11267
bayouwq	BUK9123	07-Oct-91	31616		8600		11359	00-Jan-00									pbayou	HP	11263
bayouwq	BUJ9127	07-Oct-91	31616		240		11360	00-Jan-00									pbayou	HP	11261
bayouwq	BUH9126	07-Oct-91	31616		360		11362	00-Jan-00									pbayou	HP	11259
bayouwq	BUD9125	07-Oct-91	31616		870		11364	00-Jan-00									pbayou	HP	11253
bayouwq	BUW9126	07-Oct-91	31616		5900		15841	00-Jan-00									pbayou	HP	11287
bayouwq	BUU9115	07-Oct-91	31616		4000		15842	00-Jan-00									pbayou	HP	11283
bayouwq	BUS9127	07-Oct-91	31616		480		15843	00-Jan-00									pbayou	HP	11279
bayouwq	BUQ9119	07-Oct-91	31616		340		15844	00-Jan-00									pbayou	HP	11275
bayouwq	BUN9127	07-Oct-91	31616		330		15845	00-Jan-00									pbayou	HP	11269
bayouwq	BUL9127	07-Oct-91	31616		3700		15846	00-Jan-00									pbayou	HP	11265
bayouwq	BUG9119	07-Oct-91	31616		150		15847	00-Jan-00									pbayou	HP	11257
bayouwq	BUB9610	07-Oct-96	31616		200		11142	00-Jan-00									xls96	HP	2454
bayouwq	BUC9609	07-Oct-96	31616		290		11142	00-Jan-00									xls96	HP	2455
bayouwq	BUE9617	07-Oct-96	31616		680		11163	00-Jan-00									xls96	HP	2457
bayouwq	BUV9618	07-Oct-96	31616		2500		11345	00-Jan-00									xls96	HP	2473
bayouwq	BUA9626	07-Oct-96	31616		655	QC	11351	00-Jan-00							QC		xls96	HP	2453
bayouwq	BUP9617	07-Oct-96	31616		270		11353	00-Jan-00									xls96	HP	2468
bayouwq	BUO9617	07-Oct-96	31616		280		11354	00-Jan-00									xls96	HP	2467
bayouwq	BUM9616	07-Oct-96	31616		230		11357	00-Jan-00									xls96	HP	2465
bayouwq	BUK9617	07-Oct-96	31616		650		11359	00-Jan-00									xls96	HP	2463
bayouwq	BUJ9614	07-Oct-96	31616		3400		11360	00-Jan-00									xls96	HP	2462
bayouwq	BUI9615	07-Oct-96	31616		430		11361	00-Jan-00									xls96	HP	2461
bayouwq	BUH9617	07-Oct-96	31616		520		11362	00-Jan-00									xls96	HP	2460
bayouwq	BUF9615	07-Oct-96	31616		320		11363	00-Jan-00									xls96	HP	2458
bayouwq	BUD9617	07-Oct-96	31616		360		11364	00-Jan-00									xls96	HP	2456
bayouwq	BUX9617	07-Oct-96	31616		1990		15840	00-Jan-00									xls96	HP	2475
bayouwq	BUW9616	07-Oct-96	31616		2400		15841	00-Jan-00									xls96	HP	2474
bayouwq	BUS9617	07-Oct-96	31616		2300		15843	00-Jan-00									xls96	HP	2471
bayouwq	BUQ9617	07-Oct-96	31616		490		15844	00-Jan-00									xls96	HP	2469
bayouwq	BUN9617	07-Oct-96	31616		320		15845	00-Jan-00									xls96	HP	2466
bayouwq	BUL9617	07-Oct-96	31616		72		15846	00-Jan-00									xls96	HP	2464
bayouwq	BUG9615	07-Oct-96	31616		3100		15847	00-Jan-00									xls96	HP	2459
bayouwq	BUB9029	08-Oct-90	31616		910		11142	00-Jan-00									pothor1	HP	3641
bayouwq	BUE9030	08-Oct-90	31616		3200		11163	00-Jan-00									pothor1	HP	3645
bayouwq	BUA9033	08-Oct-90	31616		4200		11351	00-Jan-00									pothor1	HP	3667
bayouwq	BUP9006	08-Oct-90	31616		35000		11353	00-Jan-00									pothor1	HP	3663
bayouwq	BUO9030	08-Oct-90	31616		10000		11354	00-Jan-00									pothor1	HP	3661
bayouwq	BUM9030	08-Oct-90	31616		29000		11357	00-Jan-00									pothor1	HP	3657
bayouwq	BUK9030	08-Oct-90	31616		9400		11359	00-Jan-00									pothor1	HP	3653
bayouwq	BUJ9031	08-Oct-90	31616		1500		11360	00-Jan-00									pothor1	HP	3651
bayouwq	BUH9030	08-Oct-90	31616		2200		11362	00-Jan-00									pothor1	HP	3649
bayouwq	BUD9030	08-Oct-90	31616		33000		11364	00-Jan-00									pothor1	HP	3643
bayouwq	BUW9031	08-Oct-90	31616		10000		15841	00-Jan-00									pothor1	HP	3675
bayouwq	BUS9031	08-Oct-90	31616		9000		15843	00-Jan-00									pothor1	HP	3669

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUQ9030	08-Oct-90	31616		21000		15844	00-Jan-00									poth1	HP	3665
bayouwq	BUN9033	08-Oct-90	31616		20000		15845	00-Jan-00									poth1	HP	3659
bayouwq	BUL9029	08-Oct-90	31616		9100		15846	00-Jan-00									poth1	HP	3655
bayouwq	BUG9030	08-Oct-90	31616		10000		15847	00-Jan-00									poth1	HP	3647
bayouwq	BUA9211	08-Oct-92	31616		2000		11351	00-Jan-00									pbayou	HP	12158
bayouwq	BUV9619	09-Oct-96	31616		4400		11345	00-Jan-00									bayou95	HP	499
bayouwq	BUA8806	10-Oct-88	31616		3500		11351	00-Jan-00									poth1	HP	9972
bayouwq	BUO8806	10-Oct-88	31616		19700		11354	00-Jan-00									poth1	HP	9971
bayouwq	BUM8806	10-Oct-88	31616		41		11357	00-Jan-00									poth1	HP	9970
bayouwq	BUJ8806	10-Oct-88	31616		1		11360	00-Jan-00									poth1	HP	9968
bayouwq	BUH8806	10-Oct-88	31616		2100		11362	00-Jan-00									poth1	HP	9967
bayouwq	BUX8806	10-Oct-88	31616		2200		15840	00-Jan-00									poth1	HP	9977
bayouwq	BUW8806	10-Oct-88	31616		20100		15841	00-Jan-00									poth1	HP	9976
bayouwq	BUU8806	10-Oct-88	31616		17700		15842	00-Jan-00									poth1	HP	9975
bayouwq	BUS8806	10-Oct-88	31616		5100		15843	00-Jan-00									poth1	HP	9973
bayouwq	BUL8806	10-Oct-88	31616		6		15846	00-Jan-00									poth1	HP	9969
bayouwq	BUG8806	10-Oct-88	31616		650		15847	00-Jan-00									poth1	HP	9966
bayouwq	BUV8305	11-Oct-83	31616		28000		11345	00-Jan-00									poth1	HP	9091
bayouwq	BUA8306	11-Oct-83	31616		4000		11351	00-Jan-00									poth1	HP	9086
bayouwq	BUO8306	11-Oct-83	31616		9000		11354	00-Jan-00									poth1	HP	9084
bayouwq	BUM8307	11-Oct-83	31616		53000		11357	00-Jan-00									poth1	HP	9081
bayouwq	BUJ8307	11-Oct-83	31616		1		11360	00-Jan-00									poth1	HP	9078
bayouwq	BUH8307	11-Oct-83	31616		1		11362	00-Jan-00									poth1	HP	9076
bayouwq	BUX8305	11-Oct-83	31616		1		15840	00-Jan-00									poth1	HP	9095
bayouwq	BUU8301	11-Oct-83	31616		43000		15842	00-Jan-00									poth1	HP	9090
bayouwq	BUS8305	11-Oct-83	31616		67000		15843	00-Jan-00									poth1	HP	9089
bayouwq	BUB9507	11-Oct-95	31616		34000		11142	00-Jan-00									9495b	HP	82
bayouwq	BUC9506	11-Oct-95	31616		700		11142	00-Jan-00									9495b	HP	83
bayouwq	BUE9511	11-Oct-95	31616		430		11163	00-Jan-00									9495b	HP	85
bayouwq	BUV9513	11-Oct-95	31616		3400		11345	00-Jan-00									9495b	HP	100
bayouwq	BUA9517	11-Oct-95	31616		10000	BM	11351	00-Jan-00							BM		9495b	HP	96
bayouwq	BUP9510	11-Oct-95	31616		710		11353	00-Jan-00									9495b	HP	94
bayouwq	BUO9509	11-Oct-95	31616		2000		11354	00-Jan-00									9495b	HP	93
bayouwq	BUM9510	11-Oct-95	31616		3000		11357	00-Jan-00									9495b	HP	92
bayouwq	BUK9510	11-Oct-95	31616		3400		11359	00-Jan-00									9495b	HP	90
bayouwq	BUJ9511	11-Oct-95	31616		3800		11360	00-Jan-00									9495b	HP	89
bayouwq	BUH9511	11-Oct-95	31616		2800		11362	00-Jan-00									9495b	HP	88
bayouwq	BUF9511	11-Oct-95	31616		1400		11363	00-Jan-00									9495b	HP	86
bayouwq	BUD9511	11-Oct-95	31616		950		11364	00-Jan-00									9495b	HP	84
bayouwq	BUX9505	11-Oct-95	31616		980		15840	00-Jan-00									9495b	HP	102
bayouwq	BUW9509	11-Oct-95	31616		1000		15841	00-Jan-00									9495b	HP	101
bayouwq	BUS9511	11-Oct-95	31616		12000		15843	00-Jan-00									9495b	HP	97
bayouwq	BUQ9508	11-Oct-95	31616		720		15844	00-Jan-00									9495b	HP	95
bayouwq	BUN9510	11-Oct-95	31616		730		15845	00-Jan-00									9495b	HP	103
bayouwq	BUL9511	11-Oct-95	31616		1200		15846	00-Jan-00									9495b	HP	91
bayouwq	BUG9508	11-Oct-95	31616		5200		15847	00-Jan-00									9495b	HP	87
bayouwq	BUB9611	11-Oct-96	31616		34000		11142	00-Jan-00									bayou95	HP	531
bayouwq	BUC9610	11-Oct-96	31616		700		11142	00-Jan-00									bayou95	HP	532
bayouwq	BUE9618	11-Oct-96	31616		430		11163	00-Jan-00									bayou95	HP	534
bayouwq	BUV9620	11-Oct-96	31616		3400		11345	00-Jan-00									bayou95	HP	549
bayouwq	BUA9627	11-Oct-96	31616		10000	BM	11351	00-Jan-00							BM		bayou95	HP	545
bayouwq	BUP9618	11-Oct-96	31616		710		11353	00-Jan-00									bayou95	HP	543
bayouwq	BUO9618	11-Oct-96	31616		2000		11354	00-Jan-00									bayou95	HP	542
bayouwq	BUM9617	11-Oct-96	31616		3000		11357	00-Jan-00									bayou95	HP	541
bayouwq	BUK9618	11-Oct-96	31616		3400		11359	00-Jan-00									bayou95	HP	539
bayouwq	BUJ9615	11-Oct-96	31616		3800		11360	00-Jan-00									bayou95	HP	538
bayouwq	BUH9618	11-Oct-96	31616		2800		11362	00-Jan-00									bayou95	HP	537
bayouwq	BUF9616	11-Oct-96	31616		1400		11363	00-Jan-00									bayou95	HP	535

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUD9618	11-Oct-96	31616		950		11364	00-Jan-00									bayou95	HP	533
bayouwq	BUX9618	11-Oct-96	31616		980		15840	00-Jan-00									bayou95	HP	551
bayouwq	BUW9617	11-Oct-96	31616		1000		15841	00-Jan-00									bayou95	HP	550
bayouwq	BUS9618	11-Oct-96	31616		12000		15843	00-Jan-00									bayou95	HP	546
bayouwq	BUQ9618	11-Oct-96	31616		720		15844	00-Jan-00									bayou95	HP	544
bayouwq	BUN9618	11-Oct-96	31616		730		15845	00-Jan-00									bayou95	HP	552
bayouwq	BUL9618	11-Oct-96	31616		1200		15846	00-Jan-00									bayou95	HP	540
bayouwq	BUG9616	11-Oct-96	31616		5200		15847	00-Jan-00									bayou95	HP	536
bayouwq	BUB9204	12-Oct-92	31616		280		11142	00-Jan-00									pbayou	HP	11818
bayouwq	BUE9206	12-Oct-92	31616		250		11163	00-Jan-00									pbayou	HP	11822
bayouwq	BUV9207	12-Oct-92	31616		2800		11345	00-Jan-00									pbayou	HP	11852
bayouwq	BUA9212	12-Oct-92	31616		53000		11351	00-Jan-00									pbayou	HP	11844
bayouwq	BUP9207	12-Oct-92	31616		1100		11353	00-Jan-00									pbayou	HP	11840
bayouwq	BUO9207	12-Oct-92	31616		3700		11354	00-Jan-00									pbayou	HP	11838
bayouwq	BUM9206	12-Oct-92	31616		4700		11357	00-Jan-00									pbayou	HP	11834
bayouwq	BUK9206	12-Oct-92	31616		23000		11359	00-Jan-00									pbayou	HP	11830
bayouwq	BUJ9207	12-Oct-92	31616		6600		11360	00-Jan-00									pbayou	HP	11828
bayouwq	BUH9207	12-Oct-92	31616		260		11362	00-Jan-00									pbayou	HP	11826
bayouwq	BUD9206	12-Oct-92	31616		510		11364	00-Jan-00									pbayou	HP	11820
bayouwq	BUW9207	12-Oct-92	31616		2800		15841	00-Jan-00									pbayou	HP	11854
bayouwq	BUS9207	12-Oct-92	31616		5500		15843	00-Jan-00									pbayou	HP	11846
bayouwq	BUQ9204	12-Oct-92	31616		45000		15844	00-Jan-00									pbayou	HP	11842
bayouwq	BUN9207	12-Oct-92	31616		2000		15845	00-Jan-00									pbayou	HP	11836
bayouwq	BUL9206	12-Oct-92	31616		7500		15846	00-Jan-00									pbayou	HP	11832
bayouwq	BUG9205	12-Oct-92	31616		370		15847	00-Jan-00									pbayou	HP	11824
bayouwq	BUA9213	13-Oct-92	31616		2600		11351	00-Jan-00									pbayou	HP	12208
bayouwq	BUA9214	20-Oct-92	31616		2700		11351	00-Jan-00									pbayou	HP	12257
bayouwq	BUA9321	20-Oct-93	31616		7600	BM	11351	00-Jan-00							BM		pbayou	HP	12378
bayouwq	BUB9031	23-Oct-90	31616		3500		11142	00-Jan-00									pothor1	HP	3788
bayouwq	BUE9032	23-Oct-90	31616		830		11163	00-Jan-00									pothor1	HP	3792
bayouwq	BUA9035	23-Oct-90	31616		14000		11351	00-Jan-00									pothor1	HP	3814
bayouwq	BUP9008	23-Oct-90	31616		1500		11353	00-Jan-00									pothor1	HP	3810
bayouwq	BUO9032	23-Oct-90	31616		2300		11354	00-Jan-00									pothor1	HP	3808
bayouwq	BUM9031	23-Oct-90	31616		25000		11357	00-Jan-00									pothor1	HP	3804
bayouwq	BUK9032	23-Oct-90	31616		1500		11359	00-Jan-00									pothor1	HP	3800
bayouwq	BUJ9033	23-Oct-90	31616		1000		11360	00-Jan-00									pothor1	HP	3798
bayouwq	BUH9032	23-Oct-90	31616		690		11362	00-Jan-00									pothor1	HP	3796
bayouwq	BUD9032	23-Oct-90	31616		3600		11364	00-Jan-00									pothor1	HP	3790
bayouwq	BUW9032	23-Oct-90	31616		12000		15841	00-Jan-00									pothor1	HP	3822
bayouwq	BUU9027	23-Oct-90	31616		30000		15842	00-Jan-00									pothor1	HP	3820
bayouwq	BUS9033	23-Oct-90	31616		4500		15843	00-Jan-00									pothor1	HP	3816
bayouwq	BUQ9032	23-Oct-90	31616		2700		15844	00-Jan-00									pothor1	HP	3812
bayouwq	BUN9035	23-Oct-90	31616		9400		15845	00-Jan-00									pothor1	HP	3806
bayouwq	BUL9031	23-Oct-90	31616		1100		15846	00-Jan-00									pothor1	HP	3802
bayouwq	BUG9031	23-Oct-90	31616		5100		15847	00-Jan-00									pothor1	HP	3794
bayouwq	BUA9628	23-Oct-96	31616		5600	BM	11351	00-Jan-00							BM		bayou95	HP	129
bayouwq	BUA9215	27-Oct-92	31616		6000		11351	00-Jan-00									pbayou	HP	12307
bayouwq	BUA9629	30-Oct-96	31616		580	BM	11351	00-Jan-00							BM		xls96	HP	2698
bayouwq	BUA8807	03-Nov-88	31616		16306		11351	00-Jan-00									pothor1	HP	9996
bayouwq	BUO8807	03-Nov-88	31616		5400		11354	00-Jan-00									pothor1	HP	9995
bayouwq	BUM8807	03-Nov-88	31616		3900		11357	00-Jan-00									pothor1	HP	9994
bayouwq	BUJ8807	03-Nov-88	31616		10		11360	00-Jan-00									pothor1	HP	9992
bayouwq	BUH8807	03-Nov-88	31616		718		11362	00-Jan-00									pothor1	HP	9991
bayouwq	BUD8807	03-Nov-88	31616		3000		11364	00-Jan-00									pothor1	HP	9989
bayouwq	BUX8807	03-Nov-88	31616		1029		15840	00-Jan-00									pothor1	HP	10001
bayouwq	BUU8807	03-Nov-88	31616		3100		15842	00-Jan-00									pothor1	HP	9999
bayouwq	BUS8807	03-Nov-88	31616		5500		15843	00-Jan-00									pothor1	HP	9997
bayouwq	BUL8807	03-Nov-88	31616		420		15846	00-Jan-00									pothor1	HP	9993

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUG8807	03-Nov-88	31616		3100		15847	00-Jan-00									pother1	HP	9990
bayouwq	BUB9122	04-Nov-91	31616		1200		11142	00-Jan-00									pbayou	HP	12878
bayouwq	BUE9121	04-Nov-91	31616		510		11163	00-Jan-00									pbayou	HP	12882
bayouwq	BUV9109	04-Nov-91	31616		73000		11345	00-Jan-00									pbayou	HP	12912
bayouwq	BUA9130	04-Nov-91	31616		8100		11351	00-Jan-00									pbayou	HP	12904
bayouwq	BUP9124	04-Nov-91	31616		3000		11353	00-Jan-00									pbayou	HP	12900
bayouwq	BUO9125	04-Nov-91	31616		2200		11354	00-Jan-00									pbayou	HP	12898
bayouwq	BUM9122	04-Nov-91	31616		1900		11357	00-Jan-00									pbayou	HP	12894
bayouwq	BUK9125	04-Nov-91	31616		1200		11359	00-Jan-00									pbayou	HP	12890
bayouwq	BUJ9130	04-Nov-91	31616		820		11360	00-Jan-00									pbayou	HP	12888
bayouwq	BUH9129	04-Nov-91	31616		790		11362	00-Jan-00									pbayou	HP	12886
bayouwq	BUD9127	04-Nov-91	31616		910		11364	00-Jan-00									pbayou	HP	12880
bayouwq	BUW9129	04-Nov-91	31616		5800		15841	00-Jan-00									pbayou	HP	12914
bayouwq	BUU9117	04-Nov-91	31616		3500		15842	00-Jan-00									pbayou	HP	12910
bayouwq	BUS9130	04-Nov-91	31616		7800		15843	00-Jan-00									pbayou	HP	12906
bayouwq	BUQ9121	04-Nov-91	31616		9100		15844	00-Jan-00									pbayou	HP	12902
bayouwq	BUN9130	04-Nov-91	31616		2200		15845	00-Jan-00									pbayou	HP	12896
bayouwq	BUL9130	04-Nov-91	31616		1200		15846	00-Jan-00									pbayou	HP	12892
bayouwq	BUG9121	04-Nov-91	31616		430		15847	00-Jan-00									pbayou	HP	12884
bayouwq	BUE9619	04-Nov-96	31616		490		11163	00-Jan-00									xls96	HP	2725
bayouwq	BUV9621	04-Nov-96	31616		2700		11345	00-Jan-00									xls96	HP	2741
bayouwq	BUA9630	04-Nov-96	31616		560	BM	11351	00-Jan-00							BM		xls96	HP	2738
bayouwq	BUP9619	04-Nov-96	31616		360		11353	00-Jan-00									xls96	HP	2736
bayouwq	BUO9619	04-Nov-96	31616		4100		11354	00-Jan-00									xls96	HP	2735
bayouwq	BUM9618	04-Nov-96	31616		4600		11357	00-Jan-00									xls96	HP	2733
bayouwq	BUK9619	04-Nov-96	31616		460		11359	00-Jan-00									xls96	HP	2731
bayouwq	BUJ9616	04-Nov-96	31616		4600		11360	00-Jan-00									xls96	HP	2730
bayouwq	BUI9616	04-Nov-96	31616		710		11361	00-Jan-00									xls96	HP	2729
bayouwq	BUH9619	04-Nov-96	31616		490		11362	00-Jan-00									xls96	HP	2728
bayouwq	BUF9617	04-Nov-96	31616		460		11363	00-Jan-00									xls96	HP	2726
bayouwq	BUD9619	04-Nov-96	31616		670		11364	00-Jan-00									xls96	HP	2724
bayouwq	BUX9619	04-Nov-96	31616		5200		15840	00-Jan-00									xls96	HP	2743
bayouwq	BUW9618	04-Nov-96	31616		2400		15841	00-Jan-00									xls96	HP	2742
bayouwq	BUS9619	04-Nov-96	31616		390		15843	00-Jan-00									xls96	HP	2739
bayouwq	BUQ9619	04-Nov-96	31616		410		15844	00-Jan-00									xls96	HP	2737
bayouwq	BUN9619	04-Nov-96	31616		3600		15845	00-Jan-00									xls96	HP	2734
bayouwq	BUL9619	04-Nov-96	31616		390		15846	00-Jan-00									xls96	HP	2732
bayouwq	BUG9617	04-Nov-96	31616		660		15847	00-Jan-00									xls96	HP	2727
bayouwq	BUA9216	05-Nov-92	31616		5500		11351	00-Jan-00									pbayou	HP	13588
bayouwq	BUE9620	06-Nov-96	31616		870		11163	00-Jan-00									bayou95	HP	638
bayouwq	BUV9622	06-Nov-96	31616		23000		11345	00-Jan-00									bayou95	HP	654
bayouwq	BUA9631	06-Nov-96	31616		2400		11351	00-Jan-00									bayou95	HP	651
bayouwq	BUA9632	06-Nov-96	31616		1200	QC	11351	00-Jan-00							QC		bayou95	HP	634
bayouwq	BUP9620	06-Nov-96	31616		2400		11353	00-Jan-00									bayou95	HP	649
bayouwq	BUO9620	06-Nov-96	31616		4600		11354	00-Jan-00									bayou95	HP	648
bayouwq	BUM9619	06-Nov-96	31616		2300		11357	00-Jan-00									bayou95	HP	646
bayouwq	BUK9620	06-Nov-96	31616		2000		11359	00-Jan-00									bayou95	HP	644
bayouwq	BUJ9617	06-Nov-96	31616		3000		11360	00-Jan-00									bayou95	HP	643
bayouwq	BUI9617	06-Nov-96	31616		5000		11361	00-Jan-00									bayou95	HP	642
bayouwq	BUH9620	06-Nov-96	31616		3700		11362	00-Jan-00									bayou95	HP	641
bayouwq	BUF9618	06-Nov-96	31616		5000		11363	00-Jan-00									bayou95	HP	639
bayouwq	BUD9620	06-Nov-96	31616		4100		11364	00-Jan-00									bayou95	HP	637
bayouwq	BUX9620	06-Nov-96	31616		3200		15840	00-Jan-00									bayou95	HP	656
bayouwq	BUW9619	06-Nov-96	31616		4400		15841	00-Jan-00									bayou95	HP	655
bayouwq	BUS9620	06-Nov-96	31616		5000		15843	00-Jan-00									bayou95	HP	652
bayouwq	BUQ9620	06-Nov-96	31616		2300		15844	00-Jan-00									bayou95	HP	650
bayouwq	BUN9620	06-Nov-96	31616		4600		15845	00-Jan-00									bayou95	HP	647
bayouwq	BUL9620	06-Nov-96	31616		9100		15846	00-Jan-00									bayou95	HP	645

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUV9623	07-Nov-96	31616		7000		11345	00-Jan-00									bayou95	HP	682
bayouwq	BUE9417	15-Nov-94	31616		54		11163	00-Jan-00									9495a	HP	2698
bayouwq	BUV9417	15-Nov-94	31616		5900		11345	00-Jan-00									9495a	HP	2728
bayouwq	BUA9419	15-Nov-94	31616		200	BM	11351	00-Jan-00							BM		9495a	HP	2722
bayouwq	BUP9417	15-Nov-94	31616		230		11353	00-Jan-00									9495a	HP	2720
bayouwq	BUO9417	15-Nov-94	31616		160		11354	00-Jan-00									9495a	HP	2718
bayouwq	BUM9417	15-Nov-94	31616		63		11357	00-Jan-00									9495a	HP	2714
bayouwq	BUK9417	15-Nov-94	31616		81		11359	00-Jan-00									9495a	HP	2710
bayouwq	BUJ9415	15-Nov-94	31616		72		11360	00-Jan-00									9495a	HP	2708
bayouwq	BUI9412	15-Nov-94	31616		99		11361	00-Jan-00									9495a	HP	2706
bayouwq	BUH9417	15-Nov-94	31616		220		11362	00-Jan-00									9495a	HP	2704
bayouwq	BUF9412	15-Nov-94	31616		63		11363	00-Jan-00									9495a	HP	2700
bayouwq	BUD9417	15-Nov-94	31616		180		11364	00-Jan-00									9495a	HP	2696
bayouwq	BUW9414	15-Nov-94	31616		820		15841	00-Jan-00									9495a	HP	2730
bayouwq	BUS9417	15-Nov-94	31616		140		15843	00-Jan-00									9495a	HP	2724
bayouwq	BUN9417	15-Nov-94	31616		99		15845	00-Jan-00									9495a	HP	2716
bayouwq	BUL9417	15-Nov-94	31616		36		15846	00-Jan-00									9495a	HP	2712
bayouwq	BUG9415	15-Nov-94	31616		160		15847	00-Jan-00									9495a	HP	2702
bayouwq	BUV9208	16-Nov-92	31616		6500		11345	00-Jan-00									pbayou	HP	13330
bayouwq	BUA9217	16-Nov-92	31616		2100		11351	00-Jan-00									pbayou	HP	13322
bayouwq	BUP9208	16-Nov-92	31616		1900		11353	00-Jan-00									pbayou	HP	13318
bayouwq	BUK9207	16-Nov-92	31616		4500		11359	00-Jan-00									pbayou	HP	13308
bayouwq	BUJ9208	16-Nov-92	31616		2100		11360	00-Jan-00									pbayou	HP	13306
bayouwq	BUH9208	16-Nov-92	31616		3400		11362	00-Jan-00									pbayou	HP	13304
bayouwq	BUD9207	16-Nov-92	31616		1400		11364	00-Jan-00									pbayou	HP	13298
bayouwq	BUW9208	16-Nov-92	31616		7700		15841	00-Jan-00									pbayou	HP	13332
bayouwq	BUS9208	16-Nov-92	31616		4000		15843	00-Jan-00									pbayou	HP	13324
bayouwq	BUN9208	16-Nov-92	31616		2500		15845	00-Jan-00									pbayou	HP	13314
bayouwq	BUL9207	16-Nov-92	31616		4400		15846	00-Jan-00									pbayou	HP	13310
bayouwq	BUA9420	16-Nov-94	31616		2100	BM	11351	00-Jan-00							BM		9495a	HP	2555
bayouwq	BUA9633	20-Nov-96	31616		870	BM	11351	00-Jan-00							BM		xls96	HP	2957
bayouwq	BUA8506	26-Nov-85	31616		16300		11351	00-Jan-00									pothor1	HP	9534
bayouwq	BUO8506	26-Nov-85	31616		3900		11354	00-Jan-00									pothor1	HP	9532
bayouwq	BUM8508	26-Nov-85	31616		16600		11357	00-Jan-00									pothor1	HP	9529
bayouwq	BUK8508	26-Nov-85	31616		2500		11359	00-Jan-00									pothor1	HP	9527
bayouwq	BUJ8507	26-Nov-85	31616		670		11360	00-Jan-00									pothor1	HP	9526
bayouwq	BUH8508	26-Nov-85	31616		1110		11362	00-Jan-00									pothor1	HP	9524
bayouwq	BUX8508	26-Nov-85	31616		3400		15840	00-Jan-00									pothor1	HP	9543
bayouwq	BUW8508	26-Nov-85	31616		9600		15841	00-Jan-00									pothor1	HP	9540
bayouwq	BUU8508	26-Nov-85	31616		11300		15842	00-Jan-00									pothor1	HP	9538
bayouwq	BUS8508	26-Nov-85	31616		11400		15843	00-Jan-00									pothor1	HP	9537
bayouwq	BUL8505	26-Nov-85	31616		600		15846	00-Jan-00									pothor1	HP	9528
bayouwq	BUE9418	29-Nov-94	31616		350		11163	00-Jan-00									9495a	HP	2763
bayouwq	BUV9418	29-Nov-94	31616		700		11345	00-Jan-00									9495a	HP	2791
bayouwq	BUA9421	29-Nov-94	31616		2100	BM	11351	00-Jan-00							BM		9495a	HP	2785
bayouwq	BUP9418	29-Nov-94	31616		8400		11353	00-Jan-00									9495a	HP	2783
bayouwq	BUO9418	29-Nov-94	31616		8000		11354	00-Jan-00									9495a	HP	2781
bayouwq	BUM9418	29-Nov-94	31616		2200		11357	00-Jan-00									9495a	HP	2777
bayouwq	BUK9418	29-Nov-94	31616		660		11359	00-Jan-00									9495a	HP	2773
bayouwq	BUJ9416	29-Nov-94	31616		840		11360	00-Jan-00									9495a	HP	2771
bayouwq	BUH9418	29-Nov-94	31616		950		11362	00-Jan-00									9495a	HP	2769
bayouwq	BUF9413	29-Nov-94	31616		490		11363	00-Jan-00									9495a	HP	2765
bayouwq	BUD9418	29-Nov-94	31616		250		11364	00-Jan-00									9495a	HP	2761
bayouwq	BUW9415	29-Nov-94	31616		240		15841	00-Jan-00									9495a	HP	2793
bayouwq	BUS9418	29-Nov-94	31616		2500		15843	00-Jan-00									9495a	HP	2787
bayouwq	BUN9418	29-Nov-94	31616		14000		15845	00-Jan-00									9495a	HP	2779
bayouwq	BUL9418	29-Nov-94	31616		390		15846	00-Jan-00									9495a	HP	2775
bayouwq	BUG9416	29-Nov-94	31616		580		15847	00-Jan-00									9495a	HP	2767

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUA9422	30-Nov-94	31616		2800	BM	11351	00-Jan-00								BM	9495a	HP	2652
bayouwq	BUB8905	04-Dec-89	31616		150		11142	00-Jan-00									pothor1	HP	10234
bayouwq	BUE8901	04-Dec-89	31616		63		11163	00-Jan-00									pothor1	HP	10238
bayouwq	BUA8908	04-Dec-89	31616		6200		11351	00-Jan-00									pothor1	HP	10258
bayouwq	BUO8907	04-Dec-89	31616		36		11354	00-Jan-00									pothor1	HP	10254
bayouwq	BUM8908	04-Dec-89	31616		9		11357	00-Jan-00									pothor1	HP	10250
bayouwq	BUK8901	04-Dec-89	31616		9		11359	00-Jan-00									pothor1	HP	10246
bayouwq	BUJ8908	04-Dec-89	31616		9		11360	00-Jan-00									pothor1	HP	10244
bayouwq	BUH8908	04-Dec-89	31616		1100		11362	00-Jan-00									pothor1	HP	10242
bayouwq	BUD8907	04-Dec-89	31616		770		11364	00-Jan-00									pothor1	HP	10236
bayouwq	BUX8908	04-Dec-89	31616		150		15840	00-Jan-00									pothor1	HP	10270
bayouwq	BUW8906	04-Dec-89	31616		5700		15841	00-Jan-00									pothor1	HP	10266
bayouwq	BUU8908	04-Dec-89	31616		5100		15842	00-Jan-00									pothor1	HP	10264
bayouwq	BUS8908	04-Dec-89	31616		1700		15843	00-Jan-00									pothor1	HP	10260
bayouwq	BUQ8906	04-Dec-89	31616		6400		15844	00-Jan-00									pothor1	HP	10256
bayouwq	BUN8906	04-Dec-89	31616		18		15845	00-Jan-00									pothor1	HP	10252
bayouwq	BUL8908	04-Dec-89	31616		9		15846	00-Jan-00									pothor1	HP	10248
bayouwq	BUG8908	04-Dec-89	31616		590		15847	00-Jan-00									pothor1	HP	10240
bayouwq	BUB9508	05-Dec-95	31616		980		11142	00-Jan-00									9495b	HP	121
bayouwq	BUC9507	05-Dec-95	31616		220		11142	00-Jan-00									9495b	HP	122
bayouwq	BUE9512	05-Dec-95	31616		270		11163	00-Jan-00									9495b	HP	124
bayouwq	BUV9514	05-Dec-95	31616		610		11345	00-Jan-00									9495b	HP	140
bayouwq	BUA9518	05-Dec-95	31616		2000		11351	00-Jan-00									9495b	HP	137
bayouwq	BUA9519	05-Dec-95	31616		9500	QC	11351	00-Jan-00								QC	9495b	HP	120
bayouwq	BUP9511	05-Dec-95	31616		3200		11353	00-Jan-00									9495b	HP	135
bayouwq	BUO9510	05-Dec-95	31616		26000		11354	00-Jan-00									9495b	HP	134
bayouwq	BUM9511	05-Dec-95	31616		340		11357	00-Jan-00									9495b	HP	132
bayouwq	BUK9511	05-Dec-95	31616		460		11359	00-Jan-00									9495b	HP	130
bayouwq	BUJ9512	05-Dec-95	31616		290		11360	00-Jan-00									9495b	HP	129
bayouwq	BUI9508	05-Dec-95	31616		370		11361	00-Jan-00									9495b	HP	128
bayouwq	BUH9512	05-Dec-95	31616		270		11362	00-Jan-00									9495b	HP	127
bayouwq	BUF9512	05-Dec-95	31616		870		11363	00-Jan-00									9495b	HP	125
bayouwq	BUD9512	05-Dec-95	31616		330		11364	00-Jan-00									9495b	HP	123
bayouwq	BUX9506	05-Dec-95	31616		385		15840	00-Jan-00									9495b	HP	142
bayouwq	BUW9510	05-Dec-95	31616		2000		15841	00-Jan-00									9495b	HP	141
bayouwq	BUS9512	05-Dec-95	31616		3800		15843	00-Jan-00									9495b	HP	138
bayouwq	BUQ9509	05-Dec-95	31616		980		15844	00-Jan-00									9495b	HP	136
bayouwq	BUN9511	05-Dec-95	31616		22000		15845	00-Jan-00									9495b	HP	133
bayouwq	BUL9512	05-Dec-95	31616		430		15846	00-Jan-00									9495b	HP	131
bayouwq	BUG9509	05-Dec-95	31616		370		15847	00-Jan-00									9495b	HP	126
bayouwq	BUB9613	05-Dec-96	31616		980		11142	00-Jan-00									bayou95	HP	901
bayouwq	BUC9612	05-Dec-96	31616		220		11142	00-Jan-00									bayou95	HP	902
bayouwq	BUE9622	05-Dec-96	31616		270		11163	00-Jan-00									bayou95	HP	904
bayouwq	BUV9625	05-Dec-96	31616		2400		11345	00-Jan-00									bayou95	HP	949
bayouwq	BUA9637	05-Dec-96	31616		2000		11351	00-Jan-00									bayou95	HP	917
bayouwq	BUA9638	05-Dec-96	31616		9500	QC	11351	00-Jan-00								QC	bayou95	HP	900
bayouwq	BUP9622	05-Dec-96	31616		3200		11353	00-Jan-00									bayou95	HP	915
bayouwq	BUO9622	05-Dec-96	31616		26000		11354	00-Jan-00									bayou95	HP	914
bayouwq	BUM9621	05-Dec-96	31616		340		11357	00-Jan-00									bayou95	HP	912
bayouwq	BUK9622	05-Dec-96	31616		460		11359	00-Jan-00									bayou95	HP	910
bayouwq	BUJ9619	05-Dec-96	31616		290		11360	00-Jan-00									bayou95	HP	909
bayouwq	BUI9619	05-Dec-96	31616		370		11361	00-Jan-00									bayou95	HP	908
bayouwq	BUH9622	05-Dec-96	31616		270		11362	00-Jan-00									bayou95	HP	907
bayouwq	BUF9620	05-Dec-96	31616		870		11363	00-Jan-00									bayou95	HP	905
bayouwq	BUD9622	05-Dec-96	31616		330		11364	00-Jan-00									bayou95	HP	903
bayouwq	BUX9622	05-Dec-96	31616		385		15840	00-Jan-00									bayou95	HP	922
bayouwq	BUW9621	05-Dec-96	31616		2000		15841	00-Jan-00									bayou95	HP	921
bayouwq	BUS9622	05-Dec-96	31616		3800		15843	00-Jan-00									bayou95	HP	918

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUQ9622	05-Dec-96	31616		980		15844	00-Jan-00									bayou95	HP	916
bayouwq	BUN9622	05-Dec-96	31616		22000		15845	00-Jan-00									bayou95	HP	913
bayouwq	BUL9622	05-Dec-96	31616		430		15846	00-Jan-00									bayou95	HP	911
bayouwq	BUG9619	05-Dec-96	31616		370		15847	00-Jan-00									bayou95	HP	906
bayouwq	BUA8606	08-Dec-86	31616		500		11351	00-Jan-00									pothor1	HP	9726
bayouwq	BUO8606	08-Dec-86	31616		350		11354	00-Jan-00									pothor1	HP	9724
bayouwq	BUM8606	08-Dec-86	31616		10		11357	00-Jan-00									pothor1	HP	9721
bayouwq	BUJ8606	08-Dec-86	31616		10		11360	00-Jan-00									pothor1	HP	9718
bayouwq	BUH8606	08-Dec-86	31616		260		11362	00-Jan-00									pothor1	HP	9716
bayouwq	BUD8604	08-Dec-86	31616		320		11364	00-Jan-00									pothor1	HP	9714
bayouwq	BUX8606	08-Dec-86	31616		1080		15840	00-Jan-00									pothor1	HP	9735
bayouwq	BUW8606	08-Dec-86	31616		9800		15841	00-Jan-00									pothor1	HP	9732
bayouwq	BUU8606	08-Dec-86	31616		24000		15842	00-Jan-00									pothor1	HP	9730
bayouwq	BUS8606	08-Dec-86	31616		730		15843	00-Jan-00									pothor1	HP	9729
bayouwq	BUL8606	08-Dec-86	31616		10		15846	00-Jan-00									pothor1	HP	9720
bayouwq	BUG8603	08-Dec-86	31616		180		15847	00-Jan-00									pothor1	HP	9715
bayouwq	BUA9218	08-Dec-92	31616		5100	BM	11351	00-Jan-00							BM		pbayou	HP	13621
bayouwq	BUA9036	10-Dec-90	31616		13000		11351	00-Jan-00									pothor1	HP	3954
bayouwq	BUO9033	10-Dec-90	31616		46000		11354	00-Jan-00									pothor1	HP	3948
bayouwq	BUM9032	10-Dec-90	31616		27000		11357	00-Jan-00									pothor1	HP	3944
bayouwq	BUK9033	10-Dec-90	31616		8000		11359	00-Jan-00									pothor1	HP	3940
bayouwq	BUH9033	10-Dec-90	31616		320		11362	00-Jan-00									pothor1	HP	3936
bayouwq	BUD9033	10-Dec-90	31616		940		11364	00-Jan-00									pothor1	HP	3930
bayouwq	BUW9033	10-Dec-90	31616		2200		15841	00-Jan-00									pothor1	HP	3962
bayouwq	BUS9034	10-Dec-90	31616		24000		15843	00-Jan-00									pothor1	HP	3956
bayouwq	BUN9036	10-Dec-90	31616		57000		15845	00-Jan-00									pothor1	HP	3946
bayouwq	BUL9032	10-Dec-90	31616		11000		15846	00-Jan-00									pothor1	HP	3942
bayouwq	BU9623	10-Dec-96	31616		770		11163	00-Jan-00									xls96	HP	3086
bayouwq	BUV9626	10-Dec-96	31616		7600		11345	00-Jan-00									xls96	HP	3102
bayouwq	BUA9639	10-Dec-96	31616		9100	BM	11351	00-Jan-00							BM		xls96	HP	3099
bayouwq	BUP9623	10-Dec-96	31616		3800		11353	00-Jan-00									xls96	HP	3097
bayouwq	BUO9623	10-Dec-96	31616		2900		11354	00-Jan-00									xls96	HP	3096
bayouwq	BUM9622	10-Dec-96	31616		1000		11357	00-Jan-00									xls96	HP	3094
bayouwq	BUK9623	10-Dec-96	31616		530		11359	00-Jan-00									xls96	HP	3092
bayouwq	BUJ9620	10-Dec-96	31616		5100		11360	00-Jan-00									xls96	HP	3091
bayouwq	BUI9620	10-Dec-96	31616		900		11361	00-Jan-00									xls96	HP	3090
bayouwq	BUH9623	10-Dec-96	31616		580		11362	00-Jan-00									xls96	HP	3089
bayouwq	BUF9621	10-Dec-96	31616		750		11363	00-Jan-00									xls96	HP	3087
bayouwq	BUD9623	10-Dec-96	31616		580		11364	00-Jan-00									xls96	HP	3085
bayouwq	BUX9623	10-Dec-96	31616		5100		15840	00-Jan-00									xls96	HP	3104
bayouwq	BUW9622	10-Dec-96	31616		1300		15841	00-Jan-00									xls96	HP	3103
bayouwq	BUS9623	10-Dec-96	31616		37000		15843	00-Jan-00									xls96	HP	3100
bayouwq	BUQ9623	10-Dec-96	31616		1400		15844	00-Jan-00									xls96	HP	3098
bayouwq	BUN9623	10-Dec-96	31616		290		15845	00-Jan-00									xls96	HP	3095
bayouwq	BUL9623	10-Dec-96	31616		460		15846	00-Jan-00									xls96	HP	3093
bayouwq	BUG9620	10-Dec-96	31616		610		15847	00-Jan-00									xls96	HP	3088
bayouwq	BUB8808	12-Dec-88	31616		757		11142	00-Jan-00									pothor1	HP	10012
bayouwq	BUA8808	12-Dec-88	31616		973		11351	00-Jan-00									pothor1	HP	10020
bayouwq	BUO8808	12-Dec-88	31616		450		11354	00-Jan-00									pothor1	HP	10019
bayouwq	BUM8808	12-Dec-88	31616		10		11357	00-Jan-00									pothor1	HP	10018
bayouwq	BUJ8808	12-Dec-88	31616		10		11360	00-Jan-00									pothor1	HP	10016
bayouwq	BUH8808	12-Dec-88	31616		171		11362	00-Jan-00									pothor1	HP	10015
bayouwq	BUD8808	12-Dec-88	31616		793		11364	00-Jan-00									pothor1	HP	10013
bayouwq	BUX8808	12-Dec-88	31616		1259		15840	00-Jan-00									pothor1	HP	10025
bayouwq	BUU8808	12-Dec-88	31616		1559		15842	00-Jan-00									pothor1	HP	10023
bayouwq	BU8808	12-Dec-88	31616		1550		15843	00-Jan-00									pothor1	HP	10021
bayouwq	BUL8808	12-Dec-88	31616		18		15846	00-Jan-00									pothor1	HP	10017
bayouwq	BUG8808	12-Dec-88	31616		108		15847	00-Jan-00									pothor1	HP	10014

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUA9640	18-Dec-96	31616		8300	BM	11351	00-Jan-00								BM	xls96	HP	3223
bayouwq	BUB8906	21-Dec-89	31616		36		11142	00-Jan-00									poth1	HP	10301
bayouwq	BUE8902	21-Dec-89	31616		72		11163	00-Jan-00									poth1	HP	10305
bayouwq	BUA8909	21-Dec-89	31616		2000		11351	00-Jan-00									poth1	HP	10325
bayouwq	BUO8908	21-Dec-89	31616		9		11354	00-Jan-00									poth1	HP	10321
bayouwq	BUM8909	21-Dec-89	31616		9		11357	00-Jan-00									poth1	HP	10317
bayouwq	BUK8902	21-Dec-89	31616		9		11359	00-Jan-00									poth1	HP	10313
bayouwq	BUJ8909	21-Dec-89	31616		9		11360	00-Jan-00									poth1	HP	10311
bayouwq	BUH8909	21-Dec-89	31616		9		11362	00-Jan-00									poth1	HP	10309
bayouwq	BUD8908	21-Dec-89	31616		81		11364	00-Jan-00									poth1	HP	10303
bayouwq	BUX8909	21-Dec-89	31616		27		15840	00-Jan-00									poth1	HP	10337
bayouwq	BUW8907	21-Dec-89	31616		2600		15841	00-Jan-00									poth1	HP	10333
bayouwq	BUU8909	21-Dec-89	31616		1100		15842	00-Jan-00									poth1	HP	10331
bayouwq	BUS8909	21-Dec-89	31616		2200		15843	00-Jan-00									poth1	HP	10327
bayouwq	BUQ8907	21-Dec-89	31616		1000		15844	00-Jan-00									poth1	HP	10323
bayouwq	BUN8907	21-Dec-89	31616		9		15845	00-Jan-00									poth1	HP	10319
bayouwq	BUL8909	21-Dec-89	31616		9		15846	00-Jan-00									poth1	HP	10315
bayouwq	BUG8909	21-Dec-89	31616		9		15847	00-Jan-00									poth1	HP	10307
bayouwq	BUB8907	28-Dec-89	31616		72		11142	00-Jan-00									poth1	HP	10370
bayouwq	BUE8903	28-Dec-89	31616		260		11163	00-Jan-00									poth1	HP	10374
bayouwq	BUA8910	28-Dec-89	31616		160		11351	00-Jan-00									poth1	HP	10394
bayouwq	BUO8909	28-Dec-89	31616		9		11354	00-Jan-00									poth1	HP	10390
bayouwq	BUM8910	28-Dec-89	31616		9		11357	00-Jan-00									poth1	HP	10386
bayouwq	BUK8903	28-Dec-89	31616		9		11359	00-Jan-00									poth1	HP	10382
bayouwq	BUJ8910	28-Dec-89	31616		18		11360	00-Jan-00									poth1	HP	10380
bayouwq	BUH8910	28-Dec-89	31616		9		11362	00-Jan-00									poth1	HP	10378
bayouwq	BUD8909	28-Dec-89	31616		54		11364	00-Jan-00									poth1	HP	10372
bayouwq	BUX8910	28-Dec-89	31616		9		15840	00-Jan-00									poth1	HP	10406
bayouwq	BUW8908	28-Dec-89	31616		3800		15841	00-Jan-00									poth1	HP	10402
bayouwq	BUU8910	28-Dec-89	31616		2200		15842	00-Jan-00									poth1	HP	10400
bayouwq	BUS8910	28-Dec-89	31616		3600		15843	00-Jan-00									poth1	HP	10396
bayouwq	BUQ8908	28-Dec-89	31616		140		15844	00-Jan-00									poth1	HP	10392
bayouwq	BUN8908	28-Dec-89	31616		9		15845	00-Jan-00									poth1	HP	10388
bayouwq	BUL8910	28-Dec-89	31616		9		15846	00-Jan-00									poth1	HP	10384
bayouwq	BUG8910	28-Dec-89	31616		300		15847	00-Jan-00									poth1	HP	10376
bayouwq	BUB8901	01-Jan-89	31616		620		11142	00-Jan-00								Exact date unknown. Default to the	poth1	HP	10036
bayouwq	BUA8901	01-Jan-89	31616		62000		11351	00-Jan-00								Exact date unknown. Default to the	poth1	HP	10044
bayouwq	BUO8901	01-Jan-89	31616		1505		11354	00-Jan-00								Exact date unknown. Default to the	poth1	HP	10043
bayouwq	BUM8901	01-Jan-89	31616		135		11357	00-Jan-00								Exact date unknown. Default to the	poth1	HP	10042
bayouwq	BUJ8901	01-Jan-89	31616		360		11360	00-Jan-00								Exact date unknown. Default to the	poth1	HP	10040
bayouwq	BUH8901	01-Jan-89	31616		310		11362	00-Jan-00								Exact date unknown. Default to the	poth1	HP	10039
bayouwq	BUD8901	01-Jan-89	31616		460		11364	00-Jan-00								Exact date unknown. Default to the	poth1	HP	10037
bayouwq	BUX8901	01-Jan-89	31616		570		15840	00-Jan-00								Exact date unknown. Default to the	poth1	HP	10049
bayouwq	BUU8901	01-Jan-89	31616		69000		15842	00-Jan-00								Exact date unknown. Default to the	poth1	HP	10047
bayouwq	BU8901	01-Jan-89	31616		77000		15843	00-Jan-00								Exact date unknown. Default to the	poth1	HP	10045
bayouwq	BUL8901	01-Jan-89	31616		30		15846	00-Jan-00								Exact date unknown. Default to the	poth1	HP	10041
bayouwq	BUG8901	01-Jan-89	31616		580		15847	00-Jan-00								Exact date unknown. Default to the	poth1	HP	10038
bayouwq	BUB8801	01-May-88	31616		1310		11142	00-Jan-00								Exact date unknown. Default to the	poth1	HP	9845
bayouwq	BUA8801	01-May-88	31616		3800		11351	00-Jan-00								Exact date unknown. Default to the	poth1	HP	9853
bayouwq	BUO8801	01-May-88	31616		4500		11354	00-Jan-00								Exact date unknown. Default to the	poth1	HP	9852
bayouwq	BUM8801	01-May-88	31616		370		11357	00-Jan-00								Exact date unknown. Default to the	poth1	HP	9851
bayouwq	BUJ8801	01-May-88	31616		15300		11360	00-Jan-00								Exact date unknown. Default to the	poth1	HP	9849
bayouwq	BUH8801	01-May-88	31616		5300		11362	00-Jan-00								Exact date unknown. Default to the	poth1	HP	9848
bayouwq	BUD8801	01-May-88	31616		1200		11364	00-Jan-00								Exact date unknown. Default to the	poth1	HP	9846
bayouwq	BUX8801	01-May-88	31616		2800		15840	00-Jan-00								Exact date unknown. Default to the	poth1	HP	9857
bayouwq	BUW8801	01-May-88	31616		2700		15841	00-Jan-00								Exact date unknown. Default to the	poth1	HP	9856
bayouwq	BUU8801	01-May-88	31616		1530		15842	00-Jan-00								Exact date unknown. Default to the	poth1	HP	9855
bayouwq	BUS8801	01-May-88	31616		4100		15843	00-Jan-00								Exact date unknown. Default to the	poth1	HP	9854

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
bayouwq	BUL8801	01-May-88	31616		330		15846	00-Jan-00								Exact date unknown. Default to the	pothorl	HP	9850
bayouwq	BUG8801	01-May-88	31616		2100		15847	00-Jan-00								Exact date unknown. Default to the	pothorl	HP	9847
HH		13-May-96			6600		11347	00-Jan-00										HH	
HH		15-May-96			560		11142	00-Jan-00										HH	
HH		15-May-96			11000		11360	00-Jan-00										HH	
HH		15-May-96			2800		11356	00-Jan-00										HH	
HH		15-May-96			2100		11351	00-Jan-00										HH	
HH		15-May-96			2300		11347	00-Jan-00										HH	
HH		21-May-96			260		11142	00-Jan-00										HH	
HH		21-May-96			1800		11360	00-Jan-00										HH	
HH		21-May-96			880		11356	00-Jan-00										HH	
HH		21-May-96			680		11351	00-Jan-00										HH	
HH		21-May-96			2000		11347	00-Jan-00										HH	
HH		23-May-96			540		11142	00-Jan-00										HH	
HH		23-May-96			19000		11360	00-Jan-00										HH	
HH		23-May-96			720		11356	00-Jan-00										HH	
HH		23-May-96			610		11351	00-Jan-00										HH	
HH		23-May-96			10000		11347	00-Jan-00										HH	
HH		13-May-96		>	160000		11148	00-Jan-00										HH	
HH		13-May-96			5000		11387	00-Jan-00										HH	
HH		03-Jun-96			160000		11148	00-Jan-00										HH	
HH		03-Jun-96			24000		11387	00-Jan-00										HH	
HH		19-Mar-96		<	200		11142	00-Jan-00										HH	
HH		19-Mar-96			50000		11360	00-Jan-00										HH	
HH		19-Mar-96		<	200		11356	00-Jan-00										HH	
HH		19-Mar-96			400		11351	00-Jan-00										HH	
HH		19-Mar-96			3000		11347	00-Jan-00										HH	
HH		04-Jan-95			800		11142	00-Jan-00										HH	
HH		04-Jan-95			900		11360	00-Jan-00										HH	
HH		04-Jan-95			1300		11356	00-Jan-00										HH	
HH		04-Jan-95			13000		11351	00-Jan-00										HH	
HH		04-Jan-95			3000		11347	00-Jan-00										HH	
HH		19-Jan-95			1700		11142	00-Jan-00										HH	
HH		19-Jan-95			3000		11360	00-Jan-00										HH	
HH		19-Jan-95			8000		11356	00-Jan-00										HH	
HH		19-Jan-95			30000		11351	00-Jan-00										HH	
HH		19-Jan-95			17000		11347	00-Jan-00										HH	
HH		16-Feb-95			8000		11387	00-Jan-00										HH	
HH		16-Feb-95			22000		11148	00-Jan-00										HH	
HH		03-Feb-95		>	160000		11148	00-Jan-00										HH	
HH		03-Feb-95			5000		11387	00-Jan-00										HH	
HH		17-Feb-95			3000		11387	00-Jan-00										HH	
HH		05-Jan-96		>	160000		11148	00-Jan-00										HH	
HH		05-Jan-96			24000		11387	00-Jan-00										HH	
HH		19-Jan-96		>	160000		11148	00-Jan-00										HH	
HH		19-Jan-96			22000		11387	00-Jan-00										HH	
HH		02-Feb-96			13000		11148	00-Jan-00										HH	
HH		02-Feb-96			13000		11387	00-Jan-00										HH	
HH		09-Feb-95			2200		11142	00-Jan-00										HH	
HH		09-Feb-95			8000		11360	00-Jan-00										HH	
HH		09-Feb-95			1700		11356	00-Jan-00										HH	
HH		09-Feb-95			17000		11351	00-Jan-00										HH	
HH		09-Feb-95			3000		11347	00-Jan-00										HH	
HH		24-Feb-95		>	160000		11148	00-Jan-00										HH	
HH		10-Mar-95			50000		11148	00-Jan-00										HH	
HH		17-Mar-95			700		11387	00-Jan-00										HH	
HH		24-Mar-95			1100		11148	00-Jan-00										HH	
HH		31-Mar-95			28000		11387	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		07-Apr-95			17000		11148	00-Jan-00										HH	
HH		28-Apr-95			3000		11387	00-Jan-00										HH	
HH		01-Mar-95			30000		11142	00-Jan-00										HH	
HH		01-Mar-95			30000		11360	00-Jan-00										HH	
HH		01-Mar-95			30000		11356	00-Jan-00										HH	
HH		01-Mar-95			24000		11351	00-Jan-00										HH	
HH		01-Mar-95			30000		11347	00-Jan-00										HH	
HH		30-Mar-95			90000		11142	00-Jan-00										HH	
HH		30-Mar-95			24000		11360	00-Jan-00										HH	
HH		30-Mar-95			13000		11356	00-Jan-00										HH	
HH		30-Mar-95			24000		11351	00-Jan-00										HH	
HH		30-Mar-95			160000		11347	00-Jan-00										HH	
HH		11-Apr-95		<	200		11142	00-Jan-00										HH	
HH		11-Apr-95			1700		11360	00-Jan-00										HH	
HH		11-Apr-95			11000		11356	00-Jan-00										HH	
HH		11-Apr-95			24000		11351	00-Jan-00										HH	
HH		11-Apr-95			24000		11347	00-Jan-00										HH	
HH		19-May-95			22000		11148	00-Jan-00										HH	
HH		19-May-95			1300		11387	00-Jan-00										HH	
HH		05-May-95			50000		11387	00-Jan-00										HH	
HH		05-May-95			90000		11148	00-Jan-00										HH	
HH		18-May-95			200		11142	00-Jan-00										HH	
HH		18-May-95			200		11360	00-Jan-00										HH	
HH		18-May-95			200		11356	00-Jan-00										HH	
HH		18-May-95			200		11351	00-Jan-00										HH	
HH		18-May-95			3000		11347	00-Jan-00										HH	
HH		25-May-95			800		11142	00-Jan-00										HH	
HH		25-May-95			30000		11360	00-Jan-00										HH	
HH		25-May-95			400		11356	00-Jan-00										HH	
HH		25-May-95			1300		11351	00-Jan-00										HH	
HH		25-May-95			13000		11347	00-Jan-00										HH	
HH		09-Jun-95			160000		11148	00-Jan-00										HH	
HH		09-Jun-95			1100		11387	00-Jan-00										HH	
HH		23-Jun-95		>	160000		11148	00-Jan-00										HH	
HH		23-Jun-95			2700		11387	00-Jan-00										HH	
HH		07-Jul-95		>	160000		11148	00-Jan-00										HH	
HH		07-Jul-95			11000		11387	00-Jan-00										HH	
HH		21-Jul-95			1300		11148	00-Jan-00										HH	
HH		21-Jul-95		>	160000		11387	00-Jan-00										HH	
HH		04-Aug-95			30000		11148	00-Jan-00										HH	
HH		04-Aug-95			30000		11387	00-Jan-00										HH	
HH		07-Jun-95		<	200		11142	00-Jan-00										HH	
HH		07-Jun-95			200		11360	00-Jan-00										HH	
HH		07-Jun-95			1300		11356	00-Jan-00										HH	
HH		07-Jun-95			1100		11351	00-Jan-00										HH	
HH		07-Jun-95			14000		11347	00-Jan-00										HH	
HH		13-Jul-95			400		11142	00-Jan-00										HH	
HH		13-Jul-95			30000		11360	00-Jan-00										HH	
HH		13-Jul-95			90000		11356	00-Jan-00										HH	
HH		13-Jul-95			30000		11351	00-Jan-00										HH	
HH		13-Jul-95			30000		11347	00-Jan-00										HH	
HH		15-Jun-95		<	200		11142	00-Jan-00										HH	
HH		15-Jun-95			200		11360	00-Jan-00										HH	
HH		15-Jun-95			400		11356	00-Jan-00										HH	
HH		15-Jun-95			1700		11351	00-Jan-00										HH	
HH		15-Jun-95			1700		11347	00-Jan-00										HH	
HH		18-Aug-95		>	160000		11148	00-Jan-00										HH	
HH		18-Aug-95			5000		11387	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		01-Sep-95		>	160000		11148	00-Jan-00										HH	
HH		01-Sep-95			160000		11387	00-Jan-00										HH	
HH		15-Sep-95		>	160000		11148	00-Jan-00										HH	
HH		15-Sep-95			800		11387	00-Jan-00										HH	
HH		03-Aug-95			900		11142	00-Jan-00										HH	
HH		03-Aug-95			24000		11360	00-Jan-00										HH	
HH		03-Aug-95			50000		11356	00-Jan-00										HH	
HH		03-Aug-95			30000		11351	00-Jan-00										HH	
HH		03-Aug-95			50000		11347	00-Jan-00										HH	
HH		13-Sep-95			200		11142	00-Jan-00										HH	
HH		13-Sep-95			17000		11360	00-Jan-00										HH	
HH		13-Sep-95			35000		11356	00-Jan-00										HH	
HH		13-Sep-95			50000		11351	00-Jan-00										HH	
HH		13-Sep-95			17000		11347	00-Jan-00										HH	
HH		28-Sep-95			400		11142	00-Jan-00										HH	
HH		28-Sep-95			3000		11360	00-Jan-00										HH	
HH		28-Sep-95			1700		11356	00-Jan-00										HH	
HH		28-Sep-95			4700		11351	00-Jan-00										HH	
HH		28-Sep-95			1700		11347	00-Jan-00										HH	
HH		20-Oct-95		>	160000		11148	00-Jan-00										HH	
HH		20-Oct-95			17000		11387	00-Jan-00										HH	
HH		03-Nov-95			160000		11148	00-Jan-00										HH	
HH		03-Nov-95			30000		11387	00-Jan-00										HH	
HH		05-Oct-95			3000		11142	00-Jan-00										HH	
HH		05-Oct-95			2300		11360	00-Jan-00										HH	
HH		05-Oct-95			3700		11356	00-Jan-00										HH	
HH		05-Oct-95			3000		11351	00-Jan-00										HH	
HH		05-Oct-95			5000		11347	00-Jan-00										HH	
HH		18-Oct-95			400		11142	00-Jan-00										HH	
HH		18-Oct-95			700		11142	00-Jan-00										HH	
HH		18-Oct-95			1300		11356	00-Jan-00										HH	
HH		18-Oct-95			3000		11351	00-Jan-00										HH	
HH		18-Oct-95			1300		11347	00-Jan-00										HH	
HH		01-Dec-95		>	160000		11148	00-Jan-00										HH	
HH		01-Dec-95			24000		11387	00-Jan-00										HH	
HH		09-Nov-95		<	200		11142	00-Jan-00										HH	
HH		09-Nov-95			200		11360	00-Jan-00										HH	
HH		09-Nov-95			1300		11356	00-Jan-00										HH	
HH		09-Nov-95			200		11351	00-Jan-00										HH	
HH		09-Nov-95			1300		11347	00-Jan-00										HH	
HH		16-Nov-95			400		11142	00-Jan-00										HH	
HH		16-Nov-95			2200		11360	00-Jan-00										HH	
HH		16-Nov-95			5000		11356	00-Jan-00										HH	
HH		16-Nov-95			11000		11351	00-Jan-00										HH	
HH		16-Nov-95			11000		11347	00-Jan-00										HH	
HH		15-Dec-95			13000		11148	00-Jan-00										HH	
HH		15-Dec-95			13000		11387	00-Jan-00										HH	
HH		05-Dec-95		<	200		11142	00-Jan-00										HH	
HH		05-Dec-95			400		11360	00-Jan-00										HH	
HH		05-Dec-95			1100		11356	00-Jan-00										HH	
HH		05-Dec-95			5000		11351	00-Jan-00										HH	
HH		05-Dec-95			3000		11347	00-Jan-00										HH	
HH		14-Dec-95			200		11142	00-Jan-00										HH	
HH		14-Dec-95			1300		11360	00-Jan-00										HH	
HH		14-Dec-95			2700		11356	00-Jan-00										HH	
HH		14-Dec-95			3000		11351	00-Jan-00										HH	
HH		14-Dec-95			2300		11347	00-Jan-00										HH	
HH		16-Feb-96			50000		11148	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		16-Feb-96			200		11387	00-Jan-00										HH	
HH		01-Mar-96		>	160000		11148	00-Jan-00										HH	
HH		03-Jan-96			400		11142	00-Jan-00										HH	
HH		03-Jan-96			1700		11360	00-Jan-00										HH	
HH		03-Jan-96			2300		11356	00-Jan-00										HH	
HH		03-Jan-96			8000		11351	00-Jan-00										HH	
HH		03-Jan-96			90000		11347	00-Jan-00										HH	
HH		30-Jan-96			200		11142	00-Jan-00										HH	
HH		30-Jan-96			800		11360	00-Jan-00										HH	
HH		30-Jan-96			1100		11356	00-Jan-00										HH	
HH		30-Jan-96			8000		11351	00-Jan-00										HH	
HH		30-Jan-96			24000		11347	00-Jan-00										HH	
HH		08-Feb-96			800		11142	00-Jan-00										HH	
HH		08-Feb-96			400		11360	00-Jan-00										HH	
HH		08-Feb-96			1100		11356	00-Jan-00										HH	
HH		08-Feb-96			8000		11351	00-Jan-00										HH	
HH		08-Feb-96			2200		11347	00-Jan-00										HH	
HH		21-Feb-96			200		11142	00-Jan-00										HH	
HH		21-Feb-96			2200		11360	00-Jan-00										HH	
HH		21-Feb-96			30000		11356	00-Jan-00										HH	
HH		21-Feb-96			13000		11351	00-Jan-00										HH	
HH		21-Feb-96			800		11347	00-Jan-00										HH	
HH		04-Mar-96			7000		11387	00-Jan-00										HH	
HH		18-Mar-96		>	160000		11148	00-Jan-00										HH	
HH		18-Mar-96			800		11387	00-Jan-00										HH	
HH		12-Apr-96			24000		11148	00-Jan-00										HH	
HH		12-Apr-96			2200		11387	00-Jan-00										HH	
HH		09-Apr-96		<	200		11142	00-Jan-00										HH	
HH		09-Apr-96			1100		11360	00-Jan-00										HH	
HH		09-Apr-96			11000		11356	00-Jan-00										HH	
HH		09-Apr-96			1300		11351	00-Jan-00										HH	
HH		09-Apr-96			24000		11347	00-Jan-00										HH	
HH		23-Apr-96			22000		11142	00-Jan-00										HH	
HH		23-Apr-96			13000		11360	00-Jan-00										HH	
HH		23-Apr-96			25000		11356	00-Jan-00										HH	
HH		23-Apr-96			60000		11351	00-Jan-00										HH	
HH		23-Apr-96			71000		11347	00-Jan-00										HH	
HH		06-May-96			50000		11148	00-Jan-00										HH	
HH		06-May-96			2300		11387	00-Jan-00										HH	
HH		01-May-96			1600		11142	00-Jan-00										HH	
HH		01-May-96			4900		11360	00-Jan-00										HH	
HH		01-May-96			2100		11356	00-Jan-00										HH	
HH		01-May-96			2000		11351	00-Jan-00										HH	
HH		01-May-96			5000		11347	00-Jan-00										HH	
HH		09-May-96			140		11142	00-Jan-00										HH	
HH		09-May-96			2700		11360	00-Jan-00										HH	
HH		09-May-96			310		11356	00-Jan-00										HH	
HH		09-May-96			670		11351	00-Jan-00										HH	
HH		09-May-96			4800		11347	00-Jan-00										HH	
HH		13-May-96			1600		11142	00-Jan-00										HH	
HH		13-May-96			6600		11360	00-Jan-00										HH	
HH		13-May-96			3900		11356	00-Jan-00										HH	
HH		13-May-96			3400		11351	00-Jan-00										HH	
HH		27-Mar-96		<	20		11142	00-Jan-00										HH	
HH		27-Mar-96			5000		11360	00-Jan-00										HH	
HH		27-Mar-96			230		11356	00-Jan-00										HH	
HH		27-Mar-96			9000		11351	00-Jan-00										HH	
HH		27-Mar-96			5000		11347	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		14-May-96			780		11142	00-Jan-00										HH	
HH		14-May-96			3600		11360	00-Jan-00										HH	
HH		14-May-96			3200		11356	00-Jan-00										HH	
HH		14-May-96			2800		11351	00-Jan-00										HH	
HH		14-May-96			4600		11347	00-Jan-00										HH	
HH		16-May-96			580		11360	00-Jan-00										HH	
HH		16-May-96			310		11142	00-Jan-00										HH	
HH		16-May-96			600		11356	00-Jan-00										HH	
HH		16-May-96			2500		11351	00-Jan-00										HH	
HH		16-May-96			2300		11347	00-Jan-00										HH	
HH		20-May-96			340		11142	00-Jan-00										HH	
HH		20-May-96			15000		11360	00-Jan-00										HH	
HH		20-May-96			730		11356	00-Jan-00										HH	
HH		20-May-96			680		11351	00-Jan-00										HH	
HH		20-May-96			930		11347	00-Jan-00										HH	
HH		22-May-96			200		11142	00-Jan-00										HH	
HH		22-May-96			6600		11360	00-Jan-00										HH	
HH		22-May-96			270		11356	00-Jan-00										HH	
HH		22-May-96			2000		11351	00-Jan-00										HH	
HH		22-May-96			5800		11347	00-Jan-00										HH	
HH		17-Jun-96			1300		11387	00-Jan-00										HH	
HH		17-Jun-96			160000		11148	00-Jan-00										HH	
HH		01-Jul-96			30000		11148	00-Jan-00										HH	
HH		01-Jul-96			1700		11387	00-Jan-00										HH	
HH		12-Jun-96			120		11142	00-Jan-00										HH	
HH		12-Jun-96			960		11360	00-Jan-00										HH	
HH		12-Jun-96			620		11356	00-Jan-00										HH	
HH		12-Jun-96			470		11351	00-Jan-00										HH	
HH		12-Jun-96			800		11347	00-Jan-00										HH	
HH		25-Jun-96			23000		11142	00-Jan-00										HH	
HH		25-Jun-96			82000		11360	00-Jan-00										HH	
HH		25-Jun-96		>	200000		11356	00-Jan-00										HH	
HH		25-Jun-96			6800		11351	00-Jan-00										HH	
HH		25-Jun-96			120000		11347	00-Jan-00										HH	
HH		15-Jul-96			7000		11148	00-Jan-00										HH	
HH		15-Jul-96			800		11387	00-Jan-00										HH	
HH		02-Jul-96			1500		11142	00-Jan-00										HH	
HH		02-Jul-96			310		11360	00-Jan-00										HH	
HH		02-Jul-96			270		11356	00-Jan-00										HH	
HH		02-Jul-96			420		11351	00-Jan-00										HH	
HH		02-Jul-96			2500		11347	00-Jan-00										HH	
HH		16-Jul-96			420		11142	00-Jan-00										HH	
HH		16-Jul-96			90		11360	00-Jan-00										HH	
HH		16-Jul-96			17000		11356	00-Jan-00										HH	
HH		16-Jul-96			2100		11351	00-Jan-00										HH	
HH		16-Jul-96			44000		11347	00-Jan-00										HH	
HH		24-Jul-96			150		11142	00-Jan-00										HH	
HH		24-Jul-96			380		11360	00-Jan-00										HH	
HH		24-Jul-96			99		11356	00-Jan-00										HH	
HH		24-Jul-96			7200		11351	00-Jan-00										HH	
HH		24-Jul-96			3200		11347	00-Jan-00										HH	
HH		09-Aug-96			50000		11148	00-Jan-00										HH	
HH		09-Aug-96			2300		11387	00-Jan-00										HH	
HH		23-Aug-96			90000		11148	00-Jan-00										HH	
HH		23-Aug-96			30000		11387	00-Jan-00										HH	
HH		22-Aug-96			24000		11347	00-Jan-00										HH	
HH		21-Aug-96			7000		11351	00-Jan-00										HH	
HH		21-Aug-96			3000		11356	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		19-Aug-96			3000		11142	00-Jan-00										HH	
HH		06-Aug-96			90		11142	00-Jan-00										HH	
HH		06-Aug-96			550		11360	00-Jan-00										HH	
HH		06-Aug-96			2100		11356	00-Jan-00										HH	
HH		06-Aug-96			430		11351	00-Jan-00										HH	
HH		06-Aug-96			1100		11347	00-Jan-00										HH	
HH		15-Aug-96			1100		11142	00-Jan-00										HH	
HH		15-Aug-96			1300		11360	00-Jan-00										HH	
HH		15-Aug-96			1700		11356	00-Jan-00										HH	
HH		15-Aug-96			51000		11351	00-Jan-00										HH	
HH		15-Aug-96			4500		11347	00-Jan-00										HH	
HH		26-Aug-96			800		11142	00-Jan-00										HH	
HH		26-Aug-96			5000		11360	00-Jan-00										HH	
HH		27-Aug-96			160000		11347	00-Jan-00										HH	
HH		28-Aug-96			160000		11356	00-Jan-00										HH	
HH		28-Aug-96		>	160000		11351	00-Jan-00										HH	
HH		29-Aug-96		>	160000		11347	00-Jan-00										HH	
HH		29-Aug-96			4000		11351	00-Jan-00										HH	
HH		05-Sep-96			5000		11347	00-Jan-00										HH	
HH		05-Sep-96			5000		11351	00-Jan-00										HH	
HH		03-Sep-96			200		11142	00-Jan-00										HH	
HH		03-Sep-96			700		11360	00-Jan-00										HH	
HH		03-Sep-96			1300		11356	00-Jan-00										HH	
HH		09-Sep-96		<	200		11360	00-Jan-00										HH	
HH		10-Sep-96			200		11142	00-Jan-00										HH	
HH		11-Sep-96			1300		11347	00-Jan-00										HH	
HH		11-Sep-96			1700		11351	00-Jan-00										HH	
HH		12-Sep-96		<	200		11142	00-Jan-00										HH	
HH		12-Sep-96			800		11360	00-Jan-00										HH	
HH		12-Sep-96			400		11356	00-Jan-00										HH	
HH		23-Sep-96			7000		11347	00-Jan-00										HH	
HH		23-Sep-96			8000		11351	00-Jan-00										HH	
HH		24-Sep-96		<	200		11142	00-Jan-00										HH	
HH		24-Sep-96			400		11360	00-Jan-00										HH	
HH		25-Sep-96			8000		11356	00-Jan-00										HH	
HH		25-Sep-96			30000		11351	00-Jan-00										HH	
HH		26-Sep-96			50000		11347	00-Jan-00										HH	
HH		16-Sep-96			30000		11142	00-Jan-00										HH	
HH		16-Sep-96			3000		11360	00-Jan-00										HH	
HH		17-Sep-96			8000		11356	00-Jan-00										HH	
HH		17-Sep-96			5000		11351	00-Jan-00										HH	
HH		18-Sep-96			50000		11347	00-Jan-00										HH	
HH		19-Sep-96			30000		11142	00-Jan-00										HH	
HH		19-Sep-96			160000		11360	00-Jan-00										HH	
HH		19-Sep-96			90000		11356	00-Jan-00										HH	
HH		30-Sep-96			2600		11360	00-Jan-00										HH	
HH		30-Sep-96		<	200		11142	00-Jan-00										HH	
HH		01-Oct-96			1100		11356	00-Jan-00										HH	
HH		01-Oct-96			7000		11351	00-Jan-00										HH	
HH		01-Oct-96			6000		11347	00-Jan-00										HH	
HH		02-Oct-96			800		11142	00-Jan-00										HH	
HH		02-Oct-96			3000		11360	00-Jan-00										HH	
HH		11-Oct-96			24000		11148	00-Jan-00										HH	
HH		11-Oct-96			24000		11387	00-Jan-00										HH	
HH		25-Oct-96		>	160000		11148	00-Jan-00										HH	
HH		25-Oct-96			160000		11387	00-Jan-00										HH	
HH		30-Oct-96			1700		11347	00-Jan-00										HH	
HH		30-Oct-96			700		11351	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		24-Oct-96		>	160000		11347	00-Jan-00										HH	
HH		24-Oct-96			5000		11351	00-Jan-00										HH	
HH		24-Oct-96			800		11356	00-Jan-00										HH	
HH		23-Oct-96			7000		11351	00-Jan-00										HH	
HH		23-Oct-96			800		11356	00-Jan-00										HH	
HH		22-Oct-96			90000		11360	00-Jan-00										HH	
HH		22-Oct-96			200		11142	00-Jan-00										HH	
HH		21-Oct-96			35000		11347	00-Jan-00										HH	
HH		12-Nov-96			50000		11347	00-Jan-00										HH	
HH		12-Nov-96			8000		11351	00-Jan-00										HH	
HH		12-Nov-96			9000		11356	00-Jan-00										HH	
HH		13-Nov-96			3000		11142	00-Jan-00										HH	
HH		13-Nov-96			400		11360	00-Jan-00										HH	
HH		04-Nov-96			400		11142	00-Jan-00										HH	
HH		04-Nov-96		<	200		11360	00-Jan-00										HH	
HH		05-Nov-96			1300		11356	00-Jan-00										HH	
HH		06-Nov-96			13000		11347	00-Jan-00										HH	
HH		06-Nov-96		>	160000		11351	00-Jan-00										HH	
HH		07-Nov-96			28000		11142	00-Jan-00										HH	
HH		07-Nov-96			90000		11360	00-Jan-00										HH	
HH		07-Nov-96			90000		11356	00-Jan-00										HH	
HH		08-Nov-96		>	160000		11148	00-Jan-00										HH	
HH		08-Nov-96			90000		11387	00-Jan-00										HH	
HH		10-Dec-96			3000		11347	00-Jan-00										HH	
HH		10-Dec-96			8000		11351	00-Jan-00										HH	
HH		09-Dec-96			700		11142	00-Jan-00										HH	
HH		09-Dec-96		<	200		11360	00-Jan-00										HH	
HH		09-Dec-96		<	200		11356	00-Jan-00										HH	
HH		11-Dec-96			5000		11347	00-Jan-00										HH	
HH		11-Dec-96			24000		11351	00-Jan-00										HH	
HH		12-Dec-96			1300		11142	00-Jan-00										HH	
HH		02-Dec-96		>	160000		11148	00-Jan-00										HH	
HH		02-Dec-96			5000		11387	00-Jan-00										HH	
HH		26-Dec-96			2300		11356	00-Jan-00										HH	
HH		26-Dec-96			1400		11360	00-Jan-00										HH	
HH		26-Dec-96			30000		11142	00-Jan-00										HH	
HH		18-Dec-96			24000		11142	00-Jan-00										HH	
HH		18-Dec-96			22000		11360	00-Jan-00										HH	
HH		31-Dec-96			50000		11356	00-Jan-00										HH	
HH		31-Dec-96			28000		11351	00-Jan-00										HH	
HH		31-Dec-96			28000		11347	00-Jan-00										HH	
HH		23-Dec-96			800		11387	00-Jan-00										HH	
HH		23-Dec-96			30000		11148	00-Jan-00										HH	
HH		15-Oct-96		>	160000		11347	00-Jan-00										HH	
HH		15-Oct-96			28000		11351	00-Jan-00										HH	
HH		16-Oct-96		<	200		11142	00-Jan-00										HH	
HH		16-Oct-96			1400		11360	00-Jan-00										HH	
HH		16-Oct-96			3000		11356	00-Jan-00										HH	
HH		14-Oct-96			2100		11356	00-Jan-00										HH	
HH		14-Oct-96			2300		11351	00-Jan-00										HH	
HH		02-Jan-97			5000		11347	00-Jan-00										HH	
HH		02-Jan-97			3000		11351	00-Jan-00										HH	
HH		02-Jan-97			8000		11356	00-Jan-00										HH	
HH		09-Jan-97			13000		11360	00-Jan-00										HH	
HH		08-Jan-97			400		11142	00-Jan-00										HH	
HH		06-Jan-97		<	200		11360	00-Jan-00										HH	
HH		06-Jan-97			700		11142	00-Jan-00										HH	
HH		07-Jan-97			13000		11347	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		07-Jan-97			1700		11351	00-Jan-00										HH	
HH		09-Jan-97			13000		11356	00-Jan-00										HH	
HH		14-Jan-97			50000		11347	00-Jan-00										HH	
HH		14-Jan-97			24000		11351	00-Jan-00										HH	
HH		15-Jan-97			13000		11142	00-Jan-00										HH	
HH		15-Jan-97			24000		11360	00-Jan-00										HH	
HH		15-Jan-97			24000		11356	00-Jan-00										HH	
HH		15-Jan-97			2300		11387	00-Jan-00										HH	
HH		02-Jan-97			3000		11387	00-Jan-00										HH	
HH		08-Jan-97			13000		11387	00-Jan-00										HH	
HH		23-Jan-97			5000		11387	00-Jan-00										HH	
HH		02-Jan-97			160000		11148	00-Jan-00										HH	
HH		08-Jan-97		>	160000		11148	00-Jan-00										HH	
HH		15-Jan-97		>	160000		11148	00-Jan-00										HH	
HH		23-Jan-97		>	160000		11148	00-Jan-00										HH	
HH		23-Jan-97			1100		11142	00-Jan-00										HH	
HH		22-Jan-97			4000		11142	00-Jan-00										HH	
HH		22-Jan-97			17000		11360	00-Jan-00										HH	
HH		22-Jan-97			17000		11356	00-Jan-00										HH	
HH		21-Jan-97			50000		11347	00-Jan-00										HH	
HH		21-Jan-97			90000		11351	00-Jan-00										HH	
HH		16-Jan-97			8000		11351	00-Jan-00										HH	
HH		16-Jan-97			8000		11347	00-Jan-00										HH	
HH		30-Jan-97			9000		11351	00-Jan-00										HH	
HH		30-Jan-97			35000		11347	00-Jan-00										HH	
HH		29-Jan-97			5000		11356	00-Jan-00										HH	
HH		29-Jan-97			5000		11360	00-Jan-00										HH	
HH		29-Jan-97			5000		11142	00-Jan-00										HH	
HH		28-Jan-97			90000		11347	00-Jan-00										HH	
HH		28-Jan-97			30000		11351	00-Jan-00										HH	
HH		27-Jan-97			800		11356	00-Jan-00										HH	
HH		27-Jan-97			1300		11360	00-Jan-00										HH	
HH		30-Jan-97			160000		11148	00-Jan-00										HH	
HH		10-Feb-97			30000		11148	00-Jan-00										HH	
HH		29-Jan-97			8000		11387	00-Jan-00										HH	
HH		04-Feb-97			5000		11387	00-Jan-00										HH	
HH		10-Feb-97			13000		11387	00-Jan-00										HH	
HH		11-Feb-97			5000		11347	00-Jan-00										HH	
HH		11-Feb-97			1300		11351	00-Jan-00										HH	
HH		10-Feb-97		<	200		11142	00-Jan-00										HH	
HH		10-Feb-97			400		11360	00-Jan-00										HH	
HH		10-Feb-97			2100		11356	00-Jan-00										HH	
HH		13-Feb-97			160000		11356	00-Jan-00										HH	
HH		03-Feb-97			400		11142	00-Jan-00										HH	
HH		03-Feb-97			800		11360	00-Jan-00										HH	
HH		04-Feb-97			3000		11351	00-Jan-00										HH	
HH		04-Feb-97			3000		11356	00-Jan-00										HH	
HH		05-Feb-97			1700		11347	00-Jan-00										HH	
HH		06-Feb-97			17000		11351	00-Jan-00										HH	
HH		06-Feb-97			7000		11347	00-Jan-00										HH	
HH		07-Mar-97			24000		16649	00-Jan-00										HH	
HH		06-Mar-97			800		11142	00-Jan-00										HH	
HH		06-Mar-97			200		11360	00-Jan-00										HH	
HH		04-Mar-97			1300		11347	00-Jan-00										HH	
HH		04-Mar-97			2200		11351	00-Jan-00										HH	
HH		03-Mar-97		<	200		11142	00-Jan-00										HH	
HH		03-Mar-97		<	200		11360	00-Jan-00										HH	
HH		03-Mar-97		<	200		11356	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		07-Mar-97			50000		16675	00-Jan-00										HH	
HH		10-Mar-97			13000		90007	00-Jan-00										HH	
HH		10-Mar-97			1700		16591	00-Jan-00										HH	
HH		10-Mar-97			700		90010	00-Jan-00										HH	
HH		10-Mar-97			400		15847	00-Jan-00										HH	
HH		10-Mar-97		<	200		11188	00-Jan-00										HH	
HH		14-Mar-97			24000		90013	00-Jan-00										HH	
HH		14-Mar-97			160000		16597	00-Jan-00										HH	
HH		14-Mar-97			30000		90012	00-Jan-00										HH	
HH		19-Feb-97			5000		11387	00-Jan-00										HH	
HH		19-Feb-97			5000		11148	00-Jan-00										HH	
HH		03-Mar-97			13000		11148	00-Jan-00										HH	
HH		25-Feb-97			13000		11387	00-Jan-00										HH	
HH		03-Mar-97			2300		11387	00-Jan-00										HH	
HH		21-Mar-97			24000		16649	00-Jan-00										HH	
HH		21-Mar-97			22000		16675	00-Jan-00										HH	
HH		24-Mar-97		<	200		16591	00-Jan-00										HH	
HH		24-Mar-97			5000		90007	00-Jan-00										HH	
HH		24-Mar-97			400		90010	00-Jan-00										HH	
HH		24-Mar-97			1100		15847	00-Jan-00										HH	
HH		24-Mar-97			200		11188	00-Jan-00										HH	
HH		28-Mar-97			2100		90013	00-Jan-00										HH	
HH		28-Mar-97			1300		16597	00-Jan-00										HH	
HH		28-Mar-97			1300		90012	00-Jan-00										HH	
HH		20-Mar-97			1700		11356	00-Jan-00										HH	
HH		20-Mar-97			900		11360	00-Jan-00										HH	
HH		20-Mar-97			200		11142	00-Jan-00										HH	
HH		17-Mar-97			17000		11356	00-Jan-00										HH	
HH		17-Mar-97			11000		11360	00-Jan-00										HH	
HH		17-Mar-97			2300		11142	00-Jan-00										HH	
HH		27-Mar-97			24000		11351	00-Jan-00										HH	
HH		27-Mar-97			13000		11347	00-Jan-00										HH	
HH		24-Mar-97			2300		11351	00-Jan-00										HH	
HH		24-Mar-97			1700		11347	00-Jan-00										HH	
HH		10-Mar-97			2700		11387	00-Jan-00										HH	
HH		10-Mar-97			1000		11148	00-Jan-00										HH	
HH		20-Mar-97			5000		11387	00-Jan-00										HH	
HH		20-Mar-97			50000		11148	00-Jan-00										HH	
HH		31-Mar-97			2300		11142	00-Jan-00										HH	
HH		31-Mar-97			30000		11360	00-Jan-00										HH	
HH		31-Mar-97			11000		11356	00-Jan-00										HH	
HH		04-Apr-97			90000		16675	00-Jan-00										HH	
HH		04-Apr-97			160000		16649	00-Jan-00										HH	
HH		01-Apr-97			7000		11387	00-Jan-00										HH	
HH		07-Apr-97			2900		11387	00-Jan-00										HH	
HH		02-Apr-97			5000		11148	00-Jan-00										HH	
HH		07-Apr-97			16000		11148	00-Jan-00										HH	
HH		07-Apr-97			1700		16591	00-Jan-00										HH	
HH		07-Apr-97			1700		90007	00-Jan-00										HH	
HH		07-Apr-97		<	200		90010	00-Jan-00										HH	
HH		07-Apr-97			3000		15847	00-Jan-00										HH	
HH		07-Apr-97			400		11188	00-Jan-00										HH	
HH		08-Apr-97			700		11356	00-Jan-00										HH	
HH		08-Apr-97			800		11351	00-Jan-00										HH	
HH		08-Apr-97			2200		11347	00-Jan-00										HH	
HH		02-Apr-97			24000		11347	00-Jan-00										HH	
HH		02-Apr-97			160000		11351	00-Jan-00										HH	
HH		03-Apr-97			400		11142	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		03-Apr-97			11000		11360	00-Jan-00										HH	
HH		03-Apr-97			90000		11356	00-Jan-00										HH	
HH		14-Apr-97			800		11360	00-Jan-00										HH	
HH		14-Apr-97		<	200		11142	00-Jan-00										HH	
HH		17-Apr-97			200		11356	00-Jan-00										HH	
HH		17-Apr-97		<	200		11360	00-Jan-00										HH	
HH		17-Apr-97		<	200		11142	00-Jan-00										HH	
HH		10-Apr-97			3000		11387	00-Jan-00										HH	
HH		10-Apr-97			2300		11148	00-Jan-00										HH	
HH		17-Mar-97			26000		11387	00-Jan-00										HH	
HH		17-Mar-97			24000		11148	00-Jan-00										HH	
HH		28-Apr-97			3300		93151	00-Jan-00										HH	
HH		28-Apr-97			1200		16595	00-Jan-00										HH	
HH		28-Apr-97			2800		16594	00-Jan-00										HH	
HH		28-Apr-97			2400		16593	00-Jan-00										HH	
HH		28-Apr-97			1600		16648	00-Jan-00										HH	
HH		23-Apr-97			30000		11387	00-Jan-00										HH	
HH		23-Apr-97			24000		11148	00-Jan-00										HH	
HH		24-Apr-97			3000		11387	00-Jan-00										HH	
HH		24-Apr-97			13000		11148	00-Jan-00										HH	
HH		04-Apr-97			94000		93151	00-Jan-00										HH	
HH		04-Apr-97			21000		16595	00-Jan-00										HH	
HH		04-Apr-97			48000		16594	00-Jan-00										HH	
HH		04-Apr-97			22000		16593	00-Jan-00										HH	
HH		23-Apr-97		<	200		11360	00-Jan-00										HH	
HH		23-Apr-97			3000		11356	00-Jan-00										HH	
HH		23-Apr-97			3300		11351	00-Jan-00										HH	
HH		23-Apr-97			7000		11347	00-Jan-00										HH	
HH		28-Apr-97			22000		11142	00-Jan-00										HH	
HH		01-May-97			1100		11142	00-Jan-00										HH	
HH		01-May-97			200		11360	00-Jan-00										HH	
HH		01-May-97		<	200		11356	00-Jan-00										HH	
HH		01-May-97			400		11351	00-Jan-00										HH	
HH		21-Apr-97			5000		11351	00-Jan-00										HH	
HH		21-Apr-97			3000		11347	00-Jan-00										HH	
HH		11-Apr-97			50000		90013	00-Jan-00										HH	
HH		11-Apr-97			24000		16597	00-Jan-00										HH	
HH		11-Apr-97			90000		90012	00-Jan-00										HH	
HH		02-May-97			90000		16649	00-Jan-00										HH	
HH		02-May-97			8000		16675	00-Jan-00										HH	
HH		02-May-97			950		11387	00-Jan-00										HH	
HH		02-May-97			900		11148	00-Jan-00										HH	
HH		07-May-97			1700		93151	00-Jan-00										HH	
HH		07-May-97			13000		16595	00-Jan-00										HH	
HH		07-May-97		<	200		16594	00-Jan-00										HH	
HH		07-May-97			1400		16595	00-Jan-00										HH	
HH		07-May-97			1100		16593	00-Jan-00										HH	
HH		05-May-97			1400		90007	00-Jan-00										HH	
HH		05-May-97			400		16591	00-Jan-00										HH	
HH		07-Mar-97			2200		16594	00-Jan-00										HH	
HH		07-Mar-97		>	200000		16595	00-Jan-00										HH	
HH		07-Mar-97			7400		93151	00-Jan-00										HH	
HH		07-Mar-97			680		16648	00-Jan-00										HH	
HH		07-Mar-97			4300		16593	00-Jan-00										HH	
HH		19-Mar-97			90000		16648	00-Jan-00										HH	
HH		19-Mar-97			90000		16593	00-Jan-00										HH	
HH		19-Mar-97			50000		16594	00-Jan-00										HH	
HH		19-Mar-97			50000		16595	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		19-Mar-97			13000		93151	00-Jan-00										HH	
HH		05-May-97		<	200		90010	00-Jan-00										HH	
HH		05-May-97			800		15847	00-Jan-00										HH	
HH		05-May-97			200		11188	00-Jan-00										HH	
HH		09-May-97			30000		90013	00-Jan-00										HH	
HH		09-May-97			13000		16597	00-Jan-00										HH	
HH		16-May-97			5000		16649	00-Jan-00										HH	
HH		16-May-97			160000		16675	00-Jan-00										HH	
HH		12-May-97			1200		11387	00-Jan-00										HH	
HH		12-May-97			1000		11148	00-Jan-00										HH	
HH		05-May-97			1900		11387	00-Jan-00										HH	
HH		05-May-97			400		11347	00-Jan-00										HH	
HH		06-May-97		<	200		11142	00-Jan-00										HH	
HH		06-May-97			200		11360	00-Jan-00										HH	
HH		06-May-97			900		11356	00-Jan-00										HH	
HH		06-May-97			1300		11351	00-Jan-00										HH	
HH		07-May-97			1300		11347	00-Jan-00										HH	
HH		21-May-97			24000		93151	00-Jan-00										HH	
HH		21-May-97			1700		16595	00-Jan-00										HH	
HH		21-May-97			90000		16594	00-Jan-00										HH	
HH		21-May-97			13000		16593	00-Jan-00										HH	
HH		21-May-97			8000		11387	00-Jan-00										HH	
HH		12-May-97		<	200		11142	00-Jan-00										HH	
HH		12-May-97			30000		11360	00-Jan-00										HH	
HH		12-May-97			200		11356	00-Jan-00										HH	
HH		12-May-97			2100		11351	00-Jan-00										HH	
HH		13-May-97			90000		11347	00-Jan-00										HH	
HH		14-May-97			400		11142	00-Jan-00										HH	
HH		14-May-97			400		11360	00-Jan-00										HH	
HH		14-May-97			200		11356	00-Jan-00										HH	
HH		15-May-97			24000		11351	00-Jan-00										HH	
HH		15-May-97			24000		11347	00-Jan-00										HH	
HH		19-May-97			22000		16591	00-Jan-00										HH	
HH		19-May-97			17000		90007	00-Jan-00										HH	
HH		19-May-97			700		90010	00-Jan-00										HH	
HH		19-May-97			8000		15847	00-Jan-00										HH	
HH		19-May-97			28000		11188	00-Jan-00										HH	
HH		23-May-97			30000		90013	00-Jan-00										HH	
HH		23-May-97			90000		16597	00-Jan-00										HH	
HH		23-May-97			50000		90012	00-Jan-00										HH	
HH		28-May-97			50000		11387	00-Jan-00										HH	
HH		28-May-97			90000		11148	00-Jan-00										HH	
HH		30-May-97			580		11148	00-Jan-00										HH	
HH		06-Jun-97			580		11387	00-Jan-00										HH	
HH		06-Jun-97			130000		11148	00-Jan-00										HH	
HH		12-Jun-97			700		11387	00-Jan-00										HH	
HH		12-Jun-97		>	160000		11148	00-Jan-00										HH	
HH		18-Jun-97		>	160000		93151	00-Jan-00										HH	
HH		18-Jun-97			9000		16595	00-Jan-00										HH	
HH		18-Jun-97			90000		16594	00-Jan-00										HH	
HH		18-Jun-97			30000		16593	00-Jan-00										HH	
HH		18-Jun-97			90000		16648	00-Jan-00										HH	
HH		19-Jun-97			8000		11148	00-Jan-00										HH	
HH		19-Jun-97			160000		11387	00-Jan-00										HH	
HH		03-Jul-97			3000		11387	00-Jan-00										HH	
HH		03-Jul-97			30000		11148	00-Jan-00										HH	
HH		30-Jun-97		<	200		11142	00-Jan-00										HH	
HH		01-Jul-97			900		11347	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		01-Jul-97			400		11351	00-Jan-00										HH	
HH		01-Jul-97			200		11356	00-Jan-00										HH	
HH		01-Jul-97			200		11360	00-Jan-00										HH	
HH		23-Jun-97			2300		11347	00-Jan-00										HH	
HH		23-Jun-97			17000		11351	00-Jan-00										HH	
HH		23-Jun-97			2300		11356	00-Jan-00										HH	
HH		23-Jun-97			1700		11360	00-Jan-00										HH	
HH		24-Jun-97			200		11142	00-Jan-00										HH	
HH		25-Jun-97			3000		11347	00-Jan-00										HH	
HH		25-Jun-97			800		11351	00-Jan-00										HH	
HH		25-Jun-97			700		11356	00-Jan-00										HH	
HH		25-Jun-97			400		11360	00-Jan-00										HH	
HH		23-Jun-97			4700		11387	00-Jan-00										HH	
HH		23-Jun-97			2900		11148	00-Jan-00										HH	
HH		11-Jul-97			1400		11387	00-Jan-00										HH	
HH		11-Jul-97			1500		11148	00-Jan-00										HH	
HH		14-Jul-97			700		11347	00-Jan-00										HH	
HH		14-Jul-97			11000		11351	00-Jan-00										HH	
HH		14-Jul-97		>	160000		11356	00-Jan-00										HH	
HH		14-Jul-97			50000		11360	00-Jan-00										HH	
HH		16-Jul-97			200		11142	00-Jan-00										HH	
HH		07-Jul-97		<	200		11142	00-Jan-00										HH	
HH		08-Jul-97			13000		11347	00-Jan-00										HH	
HH		08-Jul-97			7000		11351	00-Jan-00										HH	
HH		08-Jul-97			400		11356	00-Jan-00										HH	
HH		09-Jul-97		>	160000		11142	00-Jan-00										HH	
HH		08-Jul-97			160000		11356	00-Jan-00										HH	
HH		30-Jun-97			630		93151	00-Jan-00										HH	
HH		30-Jun-97			8400		16595	00-Jan-00										HH	
HH		17-Jul-97			2300		11387	00-Jan-00										HH	
HH		17-Jul-97			90000		11148	00-Jan-00										HH	
HH		28-Jul-97			1200		11387	00-Jan-00										HH	
HH		28-Jul-97			7900		11148	00-Jan-00										HH	
HH		29-Jul-97			13000		93151	00-Jan-00										HH	
HH		29-Jul-97			8000		16595	00-Jan-00										HH	
HH		29-Jul-97		>	160000		16594	00-Jan-00										HH	
HH		29-Jul-97		>	160000		16593	00-Jan-00										HH	
HH		29-Jul-97			50000		16648	00-Jan-00										HH	
HH		28-Jul-97			30000		11347	00-Jan-00										HH	
HH		28-Jul-97			5000		11351	00-Jan-00										HH	
HH		23-Jul-97			50000		11347	00-Jan-00										HH	
HH		23-Jul-97			5000		11356	00-Jan-00										HH	
HH		23-Jul-97			2700		11360	00-Jan-00										HH	
HH		23-Jul-97			36000		11351	00-Jan-00										HH	
HH		24-Jul-97			200		11142	00-Jan-00										HH	
HH		02-Jun-97		>	160000		16649	00-Jan-00										HH	
HH		02-Jun-97			2100		16675	00-Jan-00										HH	
HH		06-Jun-97			13000		16591	00-Jan-00										HH	
HH		06-Jun-97			50000		90007	00-Jan-00										HH	
HH		06-Jun-97		<	200		90010	00-Jan-00										HH	
HH		06-Jun-97			800		15847	00-Jan-00										HH	
HH		06-Jun-97			1100		11188	00-Jan-00										HH	
HH		20-Jun-97			30000		90013	00-Jan-00										HH	
HH		20-Jun-97			8000		16597	00-Jan-00										HH	
HH		20-Jun-97			8000		90012	00-Jan-00										HH	
HH		23-Jun-97			17000		16591	00-Jan-00										HH	
HH		23-Jun-97			160000		90007	00-Jan-00										HH	
HH		23-Jun-97			1700		90010	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		23-Jun-97			2300		15847	00-Jan-00										HH	
HH		23-Jun-97			2300		11188	00-Jan-00										HH	
HH		07-Jul-97		>	160000		16649	00-Jan-00										HH	
HH		07-Jul-97			3000		16675	00-Jan-00										HH	
HH		11-Jul-97			50000		90013	00-Jan-00										HH	
HH		11-Jul-97			17000		16597	00-Jan-00										HH	
HH		18-Jul-97			160000		16649	00-Jan-00										HH	
HH		18-Jul-97		>	160000		16675	00-Jan-00										HH	
HH		21-Jul-97			200		90010	00-Jan-00										HH	
HH		21-Jul-97			800		15847	00-Jan-00										HH	
HH		21-Jul-97			200		11188	00-Jan-00										HH	
HH		21-Jul-97			1300		90007	00-Jan-00										HH	
HH		21-Jul-97			160000		16591	00-Jan-00										HH	
HH		25-Jul-97			14000		90013	00-Jan-00										HH	
HH		25-Jul-97			90000		16597	00-Jan-00										HH	
HH		25-Jul-97			7000		90012	00-Jan-00										HH	
HH		01-Aug-97		>	160000		16649	00-Jan-00										HH	
HH		01-Aug-97		>	160000		16675	00-Jan-00										HH	
HH		04-Aug-97			1300		11188	00-Jan-00										HH	
HH		04-Aug-97			700		90010	00-Jan-00										HH	
HH		04-Aug-97			800		15847	00-Jan-00										HH	
HH		04-Aug-97			3000		90007	00-Jan-00										HH	
HH		04-Aug-97			8000		16591	00-Jan-00										HH	
HH		08-Aug-97		>	160000		90013	00-Jan-00										HH	
HH		08-Aug-97		>	160000		16597	00-Jan-00										HH	
HH		08-Aug-97		>	160000		90012	00-Jan-00										HH	
HH		15-Aug-97		>	160000		16649	00-Jan-00										HH	
HH		15-Aug-97			1700		16675	00-Jan-00										HH	
HH		12-Aug-97			1100		93151	00-Jan-00										HH	
HH		12-Aug-97		>	160000		16595	00-Jan-00										HH	
HH		12-Aug-97			200		16594	00-Jan-00										HH	
HH		12-Aug-97			30000		16593	00-Jan-00										HH	
HH		08-Aug-97			53000		11387	00-Jan-00										HH	
HH		08-Aug-97			91000		11148	00-Jan-00										HH	
HH		04-Aug-97			2100		11387	00-Jan-00										HH	
HH		04-Aug-97			2600		11148	00-Jan-00										HH	
HH		15-Aug-97			1000		11387	00-Jan-00										HH	
HH		15-Aug-97			3300		11148	00-Jan-00										HH	
HH		11-Aug-97			730		11387	00-Jan-00										HH	
HH		11-Aug-97			2100		11148	00-Jan-00										HH	
HH		18-Aug-97		>	160000		11188	00-Jan-00										HH	
HH		18-Aug-97			800		90010	00-Jan-00										HH	
HH		18-Aug-97			3000		15847	00-Jan-00										HH	
HH		18-Aug-97			5000		90007	00-Jan-00										HH	
HH		18-Aug-97			200		16591	00-Jan-00										HH	
HH		22-Aug-97			30000		90013	00-Jan-00										HH	
HH		22-Aug-97			1400		16597	00-Jan-00										HH	
HH		21-Aug-97			200		11360	00-Jan-00										HH	
HH		21-Aug-97			200		11142	00-Jan-00										HH	
HH		29-Aug-97		>	160000		16649	00-Jan-00										HH	
HH		02-Sep-97			3000		16675	00-Jan-00										HH	
HH		05-Sep-97		<	200		11188	00-Jan-00										HH	
HH		05-Sep-97			400		90010	00-Jan-00										HH	
HH		05-Sep-97			1300		15847	00-Jan-00										HH	
HH		05-Sep-97			1700		90007	00-Jan-00										HH	
HH		05-Sep-97			800		16591	00-Jan-00										HH	
HH		22-Aug-97			2900		11387	00-Jan-00										HH	
HH		22-Aug-97			1700		11148	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		26-Aug-97			13000		11347	00-Jan-00										HH	
HH		26-Aug-97			5000		11351	00-Jan-00										HH	
HH		26-Aug-97			3000		11356	00-Jan-00										HH	
HH		27-Aug-97			5000		11360	00-Jan-00										HH	
HH		27-Aug-97			5000		11142	00-Jan-00										HH	
HH		08-Sep-97			800		90013	00-Jan-00										HH	
HH		08-Sep-97			200		16597	00-Jan-00										HH	
HH		26-Aug-97			7000		93151	00-Jan-00										HH	
HH		26-Aug-97			22000		16595	00-Jan-00										HH	
HH		26-Aug-97		<	200		16594	00-Jan-00										HH	
HH		26-Aug-97			13000		16593	00-Jan-00										HH	
HH		27-Aug-97			2700		11387	00-Jan-00										HH	
HH		27-Aug-97			80000		11148	00-Jan-00										HH	
HH		05-Sep-97			1800		11387	00-Jan-00										HH	
HH		05-Sep-97			14000		11148	00-Jan-00										HH	
HH		02-Sep-97			50000		11347	00-Jan-00										HH	
HH		02-Sep-97			5000		11351	00-Jan-00										HH	
HH		02-Sep-97		>	160000		11356	00-Jan-00										HH	
HH		04-Sep-97			200		11142	00-Jan-00										HH	
HH		04-Sep-97			800		11360	00-Jan-00										HH	
HH		09-Sep-97			1100		11347	00-Jan-00										HH	
HH		09-Sep-97			2700		11351	00-Jan-00										HH	
HH		09-Sep-97			8000		11356	00-Jan-00										HH	
HH		10-Sep-97		>	160000		93151	00-Jan-00										HH	
HH		10-Sep-97		>	160000		16595	00-Jan-00										HH	
HH		10-Sep-97		>	160000		16594	00-Jan-00										HH	
HH		10-Sep-97			30000		16593	00-Jan-00										HH	
HH		10-Sep-97		>	160000		16648	00-Jan-00										HH	
HH		09-Sep-97			1700		11387	00-Jan-00										HH	
HH		09-Sep-97			5000		11148	00-Jan-00										HH	
HH		15-Sep-97		>	160000		16649	00-Jan-00										HH	
HH		15-Sep-97			90000		16675	00-Jan-00										HH	
HH		19-Sep-97		>	160000		11188	00-Jan-00										HH	
HH		19-Sep-97			900		90010	00-Jan-00										HH	
HH		19-Sep-97			50000		15847	00-Jan-00										HH	
HH		19-Sep-97			8000		90007	00-Jan-00										HH	
HH		19-Sep-97			8000		16591	00-Jan-00										HH	
HH		15-Sep-97			2100		11360	00-Jan-00										HH	
HH		15-Sep-97			1100		11142	00-Jan-00										HH	
HH		23-Sep-97		>	160000		93151	00-Jan-00										HH	
HH		23-Sep-97		>	160000		16595	00-Jan-00										HH	
HH		23-Sep-97		>	160000		16594	00-Jan-00										HH	
HH		23-Sep-97		>	160000		16593	00-Jan-00										HH	
HH		22-Sep-97			91000		11387	00-Jan-00										HH	
HH		22-Sep-97			145000		11148	00-Jan-00										HH	
HH		19-Sep-97			4700		11387	00-Jan-00										HH	
HH		19-Sep-97			95000		11148	00-Jan-00										HH	
HH		11-Aug-97			200		11142	00-Jan-00										HH	
HH		11-Aug-97			50000		11360	00-Jan-00										HH	
HH		12-Aug-97			13000		11356	00-Jan-00										HH	
HH		13-Aug-97			50000		11347	00-Jan-00										HH	
HH		13-Aug-97			30000		11351	00-Jan-00										HH	
HH		13-Aug-97			50000		11356	00-Jan-00										HH	
HH		17-Oct-97			4500		11387	00-Jan-00										HH	
HH		17-Oct-97			11000		11148	00-Jan-00										HH	
HH		30-Sep-97			7000		11387	00-Jan-00										HH	
HH		30-Sep-97			17000		11148	00-Jan-00										HH	
HH		02-Oct-97			2300		11387	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		02-Oct-97		>	160000		11148	00-Jan-00										HH	
HH		09-Oct-97		>	160000		11148	00-Jan-00										HH	
HH		09-Oct-97			30000		11387	00-Jan-00										HH	
HH		10-Oct-97			34000		93151	00-Jan-00										HH	
HH		10-Oct-97			23000		16595	00-Jan-00										HH	
HH		10-Oct-97			11000		16594	00-Jan-00										HH	
HH		10-Oct-97			990		16593	00-Jan-00										HH	
HH		10-Oct-97			63000		16648	00-Jan-00										HH	
HH		09-Oct-97			90000		11347	00-Jan-00										HH	
HH		09-Oct-97			160000		11351	00-Jan-00										HH	
HH		09-Oct-97		>	160000		11356	00-Jan-00										HH	
HH		01-Oct-97			400		11347	00-Jan-00										HH	
HH		01-Oct-97			5000		11351	00-Jan-00										HH	
HH		01-Oct-97			11000		11356	00-Jan-00										HH	
HH		02-Oct-97			30000		11142	00-Jan-00										HH	
HH		02-Oct-97			160000		11360	00-Jan-00										HH	
HH		24-Oct-97			8000		16675	00-Jan-00										HH	
HH		24-Oct-97			160000		16597	00-Jan-00										HH	
HH		24-Oct-97			90000		90013	00-Jan-00										HH	
HH		24-Oct-97		>	160000		16649	00-Jan-00										HH	
HH		22-Oct-97			8000		11347	00-Jan-00										HH	
HH		22-Oct-97			2100		11351	00-Jan-00										HH	
HH		22-Oct-97			200		11356	00-Jan-00										HH	
HH		22-Oct-97			3000		93151	00-Jan-00										HH	
HH		20-Oct-97		<	200		11142	00-Jan-00										HH	
HH		20-Oct-97		<	200		11360	00-Jan-00										HH	
HH		22-Oct-97			30000		16595	00-Jan-00										HH	
HH		22-Oct-97			800		16593	00-Jan-00										HH	
HH		22-Sep-97			160000		90013	00-Jan-00										HH	
HH		22-Sep-97		>	160000		16597	00-Jan-00										HH	
HH		22-Sep-97			90000		90012	00-Jan-00										HH	
HH		29-Sep-97			30000		16649	00-Jan-00										HH	
HH		29-Sep-97			90000		16675	00-Jan-00										HH	
HH		29-Oct-97			3000		11347	00-Jan-00										HH	
HH		29-Oct-97			13000		11351	00-Jan-00										HH	
HH		29-Oct-97			13000		11356	00-Jan-00										HH	
HH		30-Oct-97			400		11142	00-Jan-00										HH	
HH		30-Oct-97			700		11360	00-Jan-00										HH	
HH		23-Oct-97			3000		11360	00-Jan-00										HH	
HH		23-Oct-97		<	200		11142	00-Jan-00										HH	
HH		31-Oct-97		>	160000		11188	00-Jan-00										HH	
HH		31-Oct-97			30000		15847	00-Jan-00										HH	
HH		31-Oct-97			200		90010	00-Jan-00										HH	
HH		31-Oct-97			30000		90007	00-Jan-00										HH	
HH		31-Oct-97		>	160000		16591	00-Jan-00										HH	
HH		05-Nov-97			30000		16593	00-Jan-00										HH	
HH		05-Nov-97			160000		93151	00-Jan-00										HH	
HH		03-Nov-97			22000		90013	00-Jan-00										HH	
HH		03-Nov-97			3000		16597	00-Jan-00										HH	
HH		05-Nov-97			160000		16595	00-Jan-00										HH	
HH		05-Nov-97			90000		16594	00-Jan-00										HH	
HH		03-Nov-97			32000		11387	00-Jan-00										HH	
HH		03-Nov-97			110000		11148	00-Jan-00										HH	
HH		30-Oct-97			50000		11387	00-Jan-00										HH	
HH		30-Oct-97		>	160000		11148	00-Jan-00										HH	
HH		24-Oct-97			11000		11387	00-Jan-00										HH	
HH		24-Oct-97			110000		11148	00-Jan-00										HH	
HH		14-Nov-97			5000		11188	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		14-Nov-97			3000		15847	00-Jan-00										HH	
HH		14-Nov-97			7000		90010	00-Jan-00										HH	
HH		14-Nov-97			3000		90007	00-Jan-00										HH	
HH		14-Nov-97			400		16591	00-Jan-00										HH	
HH		17-Nov-97			72		11387	00-Jan-00										HH	
HH		17-Nov-97			76000		11148	00-Jan-00										HH	
HH		10-Nov-97			22000		11387	00-Jan-00										HH	
HH		10-Nov-97			27000		11148	00-Jan-00										HH	
HH		24-Nov-97			850		11387	00-Jan-00										HH	
HH		24-Nov-97		>	200000		11148	00-Jan-00										HH	
HH		10-Nov-97		>	160000		16649	00-Jan-00										HH	
HH		10-Nov-97			160000		16675	00-Jan-00										HH	
HH		17-Nov-97			30000		90013	00-Jan-00										HH	
HH		17-Nov-97			5000		16597	00-Jan-00										HH	
HH		17-Nov-97			1100		90012	00-Jan-00										HH	
HH		26-Nov-97		>	160000		16649	00-Jan-00										HH	
HH		26-Nov-97			24000		16675	00-Jan-00										HH	
HH		01-Dec-97			1700		11188	00-Jan-00										HH	
HH		01-Dec-97			5000		15847	00-Jan-00										HH	
HH		01-Dec-97			5000		90010	00-Jan-00										HH	
HH		01-Dec-97			1100		90007	00-Jan-00										HH	
HH		01-Dec-97			3000		16591	00-Jan-00										HH	
HH		05-Dec-97			30000		90013	00-Jan-00										HH	
HH		05-Dec-97			13000		16597	00-Jan-00										HH	
HH		05-Dec-97			1700		90012	00-Jan-00										HH	
HH		01-Dec-97			4500		11387	00-Jan-00										HH	
HH		01-Dec-97			48000		11148	00-Jan-00										HH	
HH		02-Dec-97			7000		16595	00-Jan-00										HH	
HH		02-Dec-97			1700		16594	00-Jan-00										HH	
HH		02-Dec-97			8000		16593	00-Jan-00										HH	
HH		02-Dec-97			2700		93151	00-Jan-00										HH	
HH		14-Nov-97			5000		11142	00-Jan-00										HH	
HH		14-Nov-97			9000		11360	00-Jan-00										HH	
HH		14-Nov-97			5000		11356	00-Jan-00										HH	
HH		14-Nov-97			28000		11351	00-Jan-00										HH	
HH		14-Nov-97			22000		11347	00-Jan-00										HH	
HH		10-Dec-97			160000		11347	00-Jan-00										HH	
HH		10-Dec-97			14000		11351	00-Jan-00										HH	
HH		10-Dec-97			14000		11356	00-Jan-00										HH	
HH		11-Dec-97			1700		16649	00-Jan-00										HH	
HH		11-Dec-97			1300		16675	00-Jan-00										HH	
HH		22-Dec-97			160000		11142	00-Jan-00										HH	
HH		22-Dec-97			160000		11360	00-Jan-00										HH	
HH		17-Dec-97		>	160000		11347	00-Jan-00										HH	
HH		17-Dec-97			2100		11351	00-Jan-00										HH	
HH		17-Dec-97			90000		11356	00-Jan-00										HH	
HH		15-Dec-97			1100		11360	00-Jan-00										HH	
HH		22-Dec-97			30000		11188	00-Jan-00										HH	
HH		22-Dec-97			5000		15847	00-Jan-00										HH	
HH		22-Dec-97			24000		90010	00-Jan-00										HH	
HH		22-Dec-97			160000		90007	00-Jan-00										HH	
HH		22-Dec-97		>	160000		16591	00-Jan-00										HH	
HH		23-Dec-97			50000		90013	00-Jan-00										HH	
HH		23-Dec-97			50000		16597	00-Jan-00										HH	
HH		23-Dec-97			24000		90012	00-Jan-00										HH	
HH		23-Dec-97			22000		90013	00-Jan-00										HH	
HH		23-Dec-97			24000		16597	00-Jan-00										HH	
HH		23-Dec-97			50000		90012	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		16-Dec-97		>	160000		16595	00-Jan-00										HH	
HH		17-Dec-97			17000		16594	00-Jan-00										HH	
HH		17-Dec-97			2200		16593	00-Jan-00										HH	
HH		15-Dec-97			2300		11142	00-Jan-00										HH	
HH		29-Dec-97		<	200		16649	00-Jan-00										HH	
HH		29-Dec-97		<	200		16675	00-Jan-00										HH	
HH		09-Dec-97			30000		11387	00-Jan-00										HH	
HH		09-Dec-97			3000		11148	00-Jan-00										HH	
HH		15-Dec-97			1900		11387	00-Jan-00										HH	
HH		15-Dec-97		>	200000		11148	00-Jan-00										HH	
HH		22-Dec-97			13000		11387	00-Jan-00										HH	
HH		22-Dec-97			98000		11148	00-Jan-00										HH	
HH		10-Mar-97			5000		11347	00-Jan-00										HH	
HH		10-Mar-97			1300		11351	00-Jan-00										HH	
HH		10-Mar-97			3000		11356	00-Jan-00										HH	
HH		12-Mar-97			90000		11347	00-Jan-00										HH	
HH		12-Mar-97			50000		11351	00-Jan-00										HH	
HH		26-Feb-97			5000		11360	00-Jan-00										HH	
HH		26-Feb-97			5000		11356	00-Jan-00										HH	
HH		26-Feb-97			1400		11142	00-Jan-00										HH	
HH		25-Feb-97			8000		11347	00-Jan-00										HH	
HH		25-Feb-97			13000		11351	00-Jan-00										HH	
HH		24-Feb-97			3000		11142	00-Jan-00										HH	
HH		24-Feb-97			1700		11360	00-Jan-00										HH	
HH		27-Feb-97			24000		11351	00-Jan-00										HH	
HH		27-Feb-97			5000		11347	00-Jan-00										HH	
HH		05-Jan-98			81000		11148	00-Jan-00										HH	
HH		05-Jan-98			21000		11387	00-Jan-00										HH	
HH		06-Jan-98		>	160000		93151	00-Jan-00										HH	
HH		06-Jan-98			90000		16595	00-Jan-00										HH	
HH		06-Jan-98		>	160000		16594	00-Jan-00										HH	
HH		06-Jan-98			50000		16593	00-Jan-00										HH	
HH		12-Jan-98			3500		11387	00-Jan-00										HH	
HH		12-Jan-98			9400		11148	00-Jan-00										HH	
HH		15-Jan-98			13000		11387	00-Jan-00										HH	
HH		21-Jan-98			30000		93151	00-Jan-00										HH	
HH		20-Jan-98			24000		16595	00-Jan-00										HH	
HH		05-Feb-98			90000		16648	00-Jan-00										HH	
HH		20-Jan-98			17000		11387	00-Jan-00										HH	
HH		20-Jan-98		>	160000		11148	00-Jan-00										HH	
HH		20-Jan-98			8000		16594	00-Jan-00										HH	
HH		30-Jan-98			36000		11148	00-Jan-00										HH	
HH		30-Jan-98			250		16648	00-Jan-00										HH	
HH		05-Feb-98			3000		16595	00-Jan-00										HH	
HH		05-Feb-98		>	160000		16594	00-Jan-00										HH	
HH		05-Feb-98			17000		16593	00-Jan-00										HH	
HH		03-Feb-98			8000		11347	00-Jan-00										HH	
HH		03-Feb-98			3000		11351	00-Jan-00										HH	
HH		03-Feb-98			24000		11356	00-Jan-00										HH	
HH		05-Jan-98			30000		11347	00-Jan-00										HH	
HH		05-Jan-98			50000		11351	00-Jan-00										HH	
HH		05-Jan-98			24000		11356	00-Jan-00										HH	
HH		08-Jan-98			30000		11142	00-Jan-00										HH	
HH		08-Jan-98			30000		11360	00-Jan-00										HH	
HH		21-Jan-98			3000		11347	00-Jan-00										HH	
HH		21-Jan-98			11000		11351	00-Jan-00										HH	
HH		21-Jan-98			3000		11356	00-Jan-00										HH	
HH		28-Jan-98			8000		11142	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		28-Jan-98			2200		11360	00-Jan-00										HH	
HH		04-Feb-98			200		11142	00-Jan-00										HH	
HH		04-Feb-98			28000		11360	00-Jan-00										HH	
HH		04-Feb-98			700		11142	00-Jan-00										HH	
HH		02-Jan-98			200		11188	00-Jan-00										HH	
HH		02-Jan-98		<	200		15847	00-Jan-00										HH	
HH		02-Jan-98			200		90010	00-Jan-00										HH	
HH		02-Jan-98			50000		90007	00-Jan-00										HH	
HH		02-Jan-98		>	160000		16591	00-Jan-00										HH	
HH		05-Jan-98		>	160000		90013	00-Jan-00										HH	
HH		05-Jan-98			24000		16597	00-Jan-00										HH	
HH		05-Jan-98			8000		90012	00-Jan-00										HH	
HH		12-Jan-98			90000		16649	00-Jan-00										HH	
HH		12-Jan-98			30000		16675	00-Jan-00										HH	
HH		23-Jan-98			5000		11188	00-Jan-00										HH	
HH		23-Jan-98			5000		15847	00-Jan-00										HH	
HH		23-Jan-98			1300		90010	00-Jan-00										HH	
HH		23-Jan-98			3000		90007	00-Jan-00										HH	
HH		23-Jan-98			5000		16591	00-Jan-00										HH	
HH		26-Jan-98			24000		90013	00-Jan-00										HH	
HH		26-Jan-98			1400		16597	00-Jan-00										HH	
HH		26-Jan-98			1700		90012	00-Jan-00										HH	
HH		10-Feb-98			14000		11347	00-Jan-00										HH	
HH		10-Feb-98			1700		11351	00-Jan-00										HH	
HH		10-Feb-98			1100		11356	00-Jan-00										HH	
HH		11-Feb-98			90000		11142	00-Jan-00										HH	
HH		11-Feb-98			160000		11360	00-Jan-00										HH	
HH		02-Feb-98			2300		16649	00-Jan-00										HH	
HH		02-Feb-98			50000		16675	00-Jan-00										HH	
HH		06-Feb-98			24000		11188	00-Jan-00										HH	
HH		06-Feb-98			30000		15847	00-Jan-00										HH	
HH		06-Feb-98			160000		90010	00-Jan-00										HH	
HH		06-Feb-98			24000		90007	00-Jan-00										HH	
HH		06-Feb-98			3000		16591	00-Jan-00										HH	
HH		09-Feb-98			50000		90013	00-Jan-00										HH	
HH		09-Feb-98			1300		16597	00-Jan-00										HH	
HH		16-Feb-98			22000		16649	00-Jan-00										HH	
HH		18-Feb-98			1300		16675	00-Jan-00										HH	
HH		20-Feb-98			1700		11188	00-Jan-00										HH	
HH		20-Feb-98		>	160000		15847	00-Jan-00										HH	
HH		20-Feb-98			1300		90010	00-Jan-00										HH	
HH		20-Feb-98			200		90007	00-Jan-00										HH	
HH		20-Feb-98			1300		16591	00-Jan-00										HH	
HH		18-Feb-98			30000		11351	00-Jan-00										HH	
HH		18-Feb-98			24000		11356	00-Jan-00										HH	
HH		19-Feb-98			3000		11142	00-Jan-00										HH	
HH		19-Feb-98			3000		11360	00-Jan-00										HH	
HH		16-Feb-98			19000		11387	00-Jan-00										HH	
HH		16-Feb-98			21000		11148	00-Jan-00										HH	
HH		16-Feb-98			15000		16648	00-Jan-00										HH	
HH		17-Feb-98			17000		93151	00-Jan-00										HH	
HH		18-Feb-98			24000		11347	00-Jan-00										HH	
HH		19-Feb-98			5000		11387	00-Jan-00										HH	
HH		19-Feb-98			160000		11148	00-Jan-00										HH	
HH		09-Feb-98			5500		11387	00-Jan-00										HH	
HH		09-Feb-98			35000		11148	00-Jan-00										HH	
HH		26-Jan-98			620		11387	00-Jan-00										HH	
HH		26-Jan-98			20000		11148	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		23-Feb-98			5000		90012	00-Jan-00										HH	
HH		23-Feb-98			24000		16597	00-Jan-00										HH	
HH		23-Feb-98			30000		90013	00-Jan-00										HH	
HH		25-Feb-98			5000		16593	00-Jan-00										HH	
HH		25-Feb-98			2300		16594	00-Jan-00										HH	
HH		25-Feb-98			8000		16595	00-Jan-00										HH	
HH		25-Feb-98			24000		93151	00-Jan-00										HH	
HH		24-Feb-98			8000		11387	00-Jan-00										HH	
HH		24-Feb-98			160000		11148	00-Jan-00										HH	
HH		02-Mar-98			5000		16649	00-Jan-00										HH	
HH		02-Mar-98			8000		16675	00-Jan-00										HH	
HH		06-Mar-98			200		11188	00-Jan-00										HH	
HH		06-Mar-98			2300		15847	00-Jan-00										HH	
HH		06-Mar-98		<	200		90010	00-Jan-00										HH	
HH		06-Mar-98			24000		90007	00-Jan-00										HH	
HH		06-Mar-98			24000		16591	00-Jan-00										HH	
HH		04-Mar-98			2300		11347	00-Jan-00										HH	
HH		04-Mar-98			2300		11351	00-Jan-00										HH	
HH		04-Mar-98			2300		11356	00-Jan-00										HH	
HH		09-Mar-98		<	200		16597	00-Jan-00										HH	
HH		09-Mar-98			9000		90013	00-Jan-00										HH	
HH		17-Mar-98			8000		11142	00-Jan-00										HH	
HH		17-Mar-98			13000		11360	00-Jan-00										HH	
HH		18-Mar-98			17000		11347	00-Jan-00										HH	
HH		18-Mar-98			5000		11351	00-Jan-00										HH	
HH		18-Mar-98			2300		11356	00-Jan-00										HH	
HH		16-Mar-98			160000		16649	00-Jan-00										HH	
HH		16-Mar-98			160000		16675	00-Jan-00										HH	
HH		20-Mar-98			17000		11188	00-Jan-00										HH	
HH		20-Mar-98			8000		15847	00-Jan-00										HH	
HH		20-Mar-98			800		90010	00-Jan-00										HH	
HH		20-Mar-98			1300		90007	00-Jan-00										HH	
HH		20-Mar-98			8000		16591	00-Jan-00										HH	
HH		05-Mar-98			5000		11387	00-Jan-00										HH	
HH		05-Mar-98			17000		11148	00-Jan-00										HH	
HH		12-Mar-98			8000		11387	00-Jan-00										HH	
HH		12-Mar-98			5000		11148	00-Jan-00										HH	
HH		12-Mar-98			8000		93151	00-Jan-00										HH	
HH		12-Mar-98		>	160000		16595	00-Jan-00										HH	
HH		27-Feb-98			59000		11148	00-Jan-00										HH	
HH		27-Feb-98			7200		11387	00-Jan-00										HH	
HH		19-Mar-98			160000		16594	00-Jan-00										HH	
HH		19-Mar-98			9000		16593	00-Jan-00										HH	
HH		19-Mar-98			2300		16648	00-Jan-00										HH	
HH		19-Mar-98			50000		11148	00-Jan-00										HH	
HH		23-Mar-98		<	200		16597	00-Jan-00										HH	
HH		23-Mar-98			2300		90013	00-Jan-00										HH	
HH		24-Mar-98			11000		11387	00-Jan-00										HH	
HH		26-Mar-98			13000		11148	00-Jan-00										HH	
HH		26-Mar-98			5000		11387	00-Jan-00										HH	
HH		23-Mar-98		<	200		11142	00-Jan-00										HH	
HH		23-Mar-98			3000		11360	00-Jan-00										HH	
HH		30-Mar-98			3000		11347	00-Jan-00										HH	
HH		30-Mar-98		<	200		11351	00-Jan-00										HH	
HH		30-Mar-98		<	200		11356	00-Jan-00										HH	
HH		31-Mar-98			1300		11347	00-Jan-00										HH	
HH		31-Mar-98			3000		11351	00-Jan-00										HH	
HH		31-Mar-98			2600		11356	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		30-Mar-98			400		16649	00-Jan-00										HH	
HH		30-Mar-98			400		16675	00-Jan-00										HH	
HH		03-Apr-98			13000		11188	00-Jan-00										HH	
HH		03-Apr-98			8000		15847	00-Jan-00										HH	
HH		03-Apr-98		<	200		90010	00-Jan-00										HH	
HH		03-Apr-98		<	200		90007	00-Jan-00										HH	
HH		03-Apr-98			160000		16591	00-Jan-00										HH	
HH		17-Mar-98			50000		11387	00-Jan-00										HH	
HH		17-Mar-98		>	160000		11148	00-Jan-00										HH	
HH		01-Apr-98			1700		93151	00-Jan-00										HH	
HH		01-Apr-98			900000		16595	00-Jan-00										HH	
HH		01-Apr-98			11000		16594	00-Jan-00										HH	
HH		01-Apr-98		<	200		16593	00-Jan-00										HH	
HH		02-Apr-98			50000		11387	00-Jan-00										HH	
HH		02-Apr-98			3000		11148	00-Jan-00										HH	
HH		07-Apr-98			1300		11148	00-Jan-00										HH	
HH		06-Apr-98		>	160000		90013	00-Jan-00										HH	
HH		06-Apr-98			1700		16597	00-Jan-00										HH	
HH		22-Apr-98			2200		11148	00-Jan-00										HH	
HH		22-Apr-98			30000		11387	00-Jan-00										HH	
HH		15-Apr-98			200		16593	00-Jan-00										HH	
HH		15-Apr-98		<	200		16594	00-Jan-00										HH	
HH		15-Apr-98			28000		16595	00-Jan-00										HH	
HH		15-Apr-98			2100		93151	00-Jan-00										HH	
HH		14-Apr-98			30000		11148	00-Jan-00										HH	
HH		14-Apr-98			30000		11387	00-Jan-00										HH	
HH		30-Apr-98			13000		11347	00-Jan-00										HH	
HH		30-Apr-98			800		11351	00-Jan-00										HH	
HH		30-Apr-98			50000		11356	00-Jan-00										HH	
HH		27-Apr-98			30000		16649	00-Jan-00										HH	
HH		27-Apr-98			1700		16675	00-Jan-00										HH	
HH		01-May-98			1300		11188	00-Jan-00										HH	
HH		01-May-98			200		15847	00-Jan-00										HH	
HH		01-May-98		<	200		90010	00-Jan-00										HH	
HH		01-May-98		<	200		90007	00-Jan-00										HH	
HH		01-May-98			1300		16591	00-Jan-00										HH	
HH		29-Apr-98			8000		11387	00-Jan-00										HH	
HH		29-Apr-98			90000		11148	00-Jan-00										HH	
HH		04-May-98		>	160000		90012	00-Jan-00										HH	
HH		04-May-98			1700		16597	00-Jan-00										HH	
HH		04-May-98			24.5		11142	00-Jan-00										HH	
HH		04-May-98			90000		11360	00-Jan-00										HH	
HH		07-May-98			30000		11347	00-Jan-00										HH	
HH		07-May-98			400		11351	00-Jan-00										HH	
HH		07-May-98			8000		11356	00-Jan-00										HH	
HH		12-May-98			200		11142	00-Jan-00										HH	
HH		12-May-98			400		11360	00-Jan-00										HH	
HH		14-May-98			200		11142	00-Jan-00										HH	
HH		14-May-98			5000		11360	00-Jan-00										HH	
HH		12-May-98			11000		11387	00-Jan-00										HH	
HH		12-May-98			30000		11148	00-Jan-00										HH	
HH		07-May-98			8000		93151	00-Jan-00										HH	
HH		07-May-98			13000		16594	00-Jan-00										HH	
HH		11-May-98		<	200		16649	00-Jan-00										HH	
HH		11-May-98			800		16675	00-Jan-00										HH	
HH		15-May-98			24000		15847	00-Jan-00										HH	
HH		15-May-98			200		90010	00-Jan-00										HH	
HH		15-May-98			50000		90007	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		15-May-98			200		16591	00-Jan-00										HH	
HH		18-May-98			3000		90013	00-Jan-00										HH	
HH		18-May-98			800		16597	00-Jan-00										HH	
HH		18-May-98			1300		11347	00-Jan-00										HH	
HH		18-May-98			3000		11351	00-Jan-00										HH	
HH		18-May-98			1700		11356	00-Jan-00										HH	
HH		21-May-98			3000		11347	00-Jan-00										HH	
HH		21-May-98			5000		11351	00-Jan-00										HH	
HH		21-May-98			400		11356	00-Jan-00										HH	
HH		28-May-98			13000		11142	00-Jan-00										HH	
HH		28-May-98			90000		11360	00-Jan-00										HH	
HH		02-Jun-98			1300		11347	00-Jan-00										HH	
HH		02-Jun-98			1700		11351	00-Jan-00										HH	
HH		02-Jun-98			200		11356	00-Jan-00										HH	
HH		03-Jun-98			200		11142	00-Jan-00										HH	
HH		03-Jun-98		<	200		11360	00-Jan-00										HH	
HH		21-May-98			1300		11387	00-Jan-00										HH	
HH		21-May-98			90000		11148	00-Jan-00										HH	
HH		28-May-98			5000		11387	00-Jan-00										HH	
HH		28-May-98		>	160000		11148	00-Jan-00										HH	
HH		01-Jun-98			830		11387	00-Jan-00										HH	
HH		01-Jun-98			28000		11148	00-Jan-00										HH	
HH		07-May-98			900		16593	00-Jan-00										HH	
HH		07-May-98			5000		11387	00-Jan-00										HH	
HH		07-May-98			50000		11148	00-Jan-00										HH	
HH		08-Jun-98		>	160000		16649	00-Jan-00										HH	
HH		08-Jun-98		>	160000		16675	00-Jan-00										HH	
HH		12-Jun-98			400		90010	00-Jan-00										HH	
HH		12-Jun-98			800		15847	00-Jan-00										HH	
HH		15-Jun-98			2200		16591	00-Jan-00										HH	
HH		15-Jun-98			2600		90007	00-Jan-00										HH	
HH		15-Jun-98			6000		90013	00-Jan-00										HH	
HH		15-Jun-98			1400		16597	00-Jan-00										HH	
HH		15-Jun-98			30000		90012	00-Jan-00										HH	
HH		12-Jun-98			610		11387	00-Jan-00										HH	
HH		12-Jun-98			4300		11148	00-Jan-00										HH	
HH		08-Jun-98			1400		11387	00-Jan-00										HH	
HH		08-Jun-98			140000		11148	00-Jan-00										HH	
HH		09-Jun-98			110000		11148	00-Jan-00										HH	
HH		11-Jun-98			5000		93151	00-Jan-00										HH	
HH		11-Jun-98			200		16594	00-Jan-00										HH	
HH		11-Jun-98			200		16593	00-Jan-00										HH	
HH		17-Jun-98		>	160000		11148	00-Jan-00										HH	
HH		18-Jun-98			50000		11387	00-Jan-00										HH	
HH		26-Jun-98			1300		90010	00-Jan-00										HH	
HH		26-Jun-98			13000		15847	00-Jan-00										HH	
HH		26-Jun-98			1300		11188	00-Jan-00										HH	
HH		26-Jun-98			1100		90007	00-Jan-00										HH	
HH		26-Jun-98			1100		16591	00-Jan-00										HH	
HH		22-Jun-98		>	160000		16649	00-Jan-00										HH	
HH		22-Jun-98			28000		16675	00-Jan-00										HH	
HH		24-Jun-98			400		11142	00-Jan-00										HH	
HH		09-Jun-98			90000		11347	00-Jan-00										HH	
HH		09-Jun-98			90000		11351	00-Jan-00										HH	
HH		09-Jun-98			8000		11356	00-Jan-00										HH	
HH		10-Jun-98			1400		11142	00-Jan-00										HH	
HH		10-Jun-98			1700		11360	00-Jan-00										HH	
HH		22-Jun-98			2300		11347	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		22-Jun-98			3000		11351	00-Jan-00										HH	
HH		22-Jun-98			22000		11356	00-Jan-00										HH	
HH		29-Jun-98		>	160000		90012	00-Jan-00										HH	
HH		29-Jun-98			160000		16597	00-Jan-00										HH	
HH		29-Jun-98		>	160000		90013	00-Jan-00										HH	
HH		08-Jul-98			30000		11387	00-Jan-00										HH	
HH		08-Jul-98			160000		11148	00-Jan-00										HH	
HH		30-Jun-98			1700		11387	00-Jan-00										HH	
HH		09-Jul-98			8000		93151	00-Jan-00										HH	
HH		09-Jul-98			1700		16594	00-Jan-00										HH	
HH		09-Jul-98			400		16593	00-Jan-00										HH	
HH		13-Jul-98			400		16649	00-Jan-00										HH	
HH		13-Jul-98			8000		16675	00-Jan-00										HH	
HH		13-Jul-98			8000		11387	00-Jan-00										HH	
HH		13-Jul-98			5000		11148	00-Jan-00										HH	
HH		15-Jul-98		>	160		11387	00-Jan-00										HH	
HH		15-Jul-98		>	160000		11387	00-Jan-00										HH	
HH		15-Jul-98		>	160000		11148	00-Jan-00										HH	
HH		13-Jul-98			8000		11351	00-Jan-00										HH	
HH		13-Jul-98			2100		11356	00-Jan-00										HH	
HH		13-Jul-98			13000		11356	00-Jan-00										HH	
HH		14-Jul-98			200		11142	00-Jan-00										HH	
HH		14-Jul-98			900		11360	00-Jan-00										HH	
HH		16-Jul-98			13000		11347	00-Jan-00										HH	
HH		16-Jul-98			17000		11351	00-Jan-00										HH	
HH		16-Jul-98			8000		11356	00-Jan-00										HH	
HH		20-Jul-98			200		11188	00-Jan-00										HH	
HH		20-Jul-98			900		90010	00-Jan-00										HH	
HH		20-Jul-98			800		15847	00-Jan-00										HH	
HH		20-Jul-98			400		90007	00-Jan-00										HH	
HH		20-Jul-98			3000		16591	00-Jan-00										HH	
HH		22-Jul-98		>	160000		90013	00-Jan-00										HH	
HH		23-Jul-98			160000		16597	00-Jan-00										HH	
HH		31-Jul-98			24000		16649	00-Jan-00										HH	
HH		31-Jul-98			50000		16675	00-Jan-00										HH	
HH		03-Aug-98			200		11188	00-Jan-00										HH	
HH		03-Aug-98			200		90010	00-Jan-00										HH	
HH		03-Aug-98			1100		15847	00-Jan-00										HH	
HH		03-Aug-98			3000		90007	00-Jan-00										HH	
HH		03-Aug-98			17000		16591	00-Jan-00										HH	
HH		07-Aug-98		>	160000		90013	00-Jan-00										HH	
HH		07-Aug-98		>	160000		16597	00-Jan-00										HH	
HH		04-Aug-98			3000		11387	00-Jan-00										HH	
HH		04-Aug-98			8000		11148	00-Jan-00										HH	
HH		14-Aug-98			67000		11148	00-Jan-00										HH	
HH		14-Aug-98			4800		11387	00-Jan-00										HH	
HH		20-Jul-98			200		11142	00-Jan-00										HH	
HH		20-Jul-98			1700		11360	00-Jan-00										HH	
HH		22-Jul-98			24000		11347	00-Jan-00										HH	
HH		22-Jul-98			800		11351	00-Jan-00										HH	
HH		22-Jul-98			30000		11356	00-Jan-00										HH	
HH		23-Jul-98			400		11142	00-Jan-00										HH	
HH		23-Jul-98			13000		11360	00-Jan-00										HH	
HH		30-Jul-98			1300		11351	00-Jan-00										HH	
HH		30-Jul-98			1700		11356	00-Jan-00										HH	
HH		04-Aug-98			200		11142	00-Jan-00										HH	
HH		04-Aug-98			1700		11360	00-Jan-00										HH	
HH		05-Aug-98			2300		11347	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		05-Aug-98			3000		11351	00-Jan-00										HH	
HH		05-Aug-98			5000		11356	00-Jan-00										HH	
HH		10-Aug-98			17000		90012	00-Jan-00										HH	
HH		14-Aug-98		>	160000		16649	00-Jan-00										HH	
HH		17-Aug-98			17000		16675	00-Jan-00										HH	
HH		17-Aug-98			8000		16597	00-Jan-00										HH	
HH		17-Aug-98			11000		90013	00-Jan-00										HH	
HH		21-Aug-98			13000		16591	00-Jan-00										HH	
HH		10-Aug-98			800		11142	00-Jan-00										HH	
HH		10-Aug-98			8000		11360	00-Jan-00										HH	
HH		13-Aug-98			3000		11347	00-Jan-00										HH	
HH		13-Aug-98			1300		11351	00-Jan-00										HH	
HH		13-Aug-98			24000		11356	00-Jan-00										HH	
HH		17-Aug-98			1700		11142	00-Jan-00										HH	
HH		17-Aug-98			5000		11360	00-Jan-00										HH	
HH		24-Aug-98			5000		11188	00-Jan-00										HH	
HH		24-Aug-98			5000		15847	00-Jan-00										HH	
HH		24-Aug-98			2300		90010	00-Jan-00										HH	
HH		24-Aug-98			11000		11142	00-Jan-00										HH	
HH		24-Aug-98			5000		11360	00-Jan-00										HH	
HH		11-Aug-98			2700		93151	00-Jan-00										HH	
HH		11-Aug-98			8000		16594	00-Jan-00										HH	
HH		11-Aug-98			200		16593	00-Jan-00										HH	
HH		11-Aug-98			17000		16594	00-Jan-00										HH	
HH		18-Aug-98		>	160000		11387	00-Jan-00										HH	
HH		03-Sep-98		>	200000		90007	00-Jan-00										HH	
HH		25-Sep-98			5000		16675	00-Jan-00										HH	
HH		28-Sep-98			160000		16649	00-Jan-00										HH	
HH		23-Oct-98			800		11142	00-Jan-00										HH	
HH		23-Oct-98			400		90010	00-Jan-00										HH	
HH		23-Oct-98		>	160000		15847	00-Jan-00										HH	
HH		23-Oct-98			50000		11188	00-Jan-00										HH	
HH		23-Oct-98			2200		11360	00-Jan-00										HH	
HH		23-Oct-98			1700		11356	00-Jan-00										HH	
HH		23-Oct-98			3000		90013	00-Jan-00										HH	
HH		23-Oct-98			9000		16597	00-Jan-00										HH	
HH		06-Nov-98			1600		93151	00-Jan-00										HH	
HH		06-Nov-98			12000		16595	00-Jan-00										HH	
HH		06-Nov-98			24000		16594	00-Jan-00										HH	
HH		06-Nov-98			2800		16593	00-Jan-00										HH	
HH		06-Nov-98			300		16591	00-Jan-00										HH	
HH		13-Nov-98			43000		16649	00-Jan-00										HH	
HH		13-Nov-98			34000		11347	00-Jan-00										HH	
HH		13-Nov-98			25000		11351	00-Jan-00										HH	
HH		13-Nov-98			34000		16675	00-Jan-00										HH	
HH		13-Nov-98			26000		11387	00-Jan-00										HH	
HH		13-Nov-98			86000		16648	00-Jan-00										HH	
HH		13-Nov-98			110000		11148	00-Jan-00										HH	
HH		20-Nov-98			260		11142	00-Jan-00										HH	
HH		20-Nov-98			99		90010	00-Jan-00										HH	
HH		20-Nov-98			500		15847	00-Jan-00										HH	
HH		20-Nov-98			37000		11188	00-Jan-00										HH	
HH		20-Nov-98			590		11360	00-Jan-00										HH	
HH		20-Nov-98			350		11356	00-Jan-00										HH	
HH		20-Nov-98			680		90013	00-Jan-00										HH	
HH		20-Nov-98			510		16597	00-Jan-00										HH	
HH		25-Nov-98			1000		93151	00-Jan-00										HH	
HH		25-Nov-98			56000		16595	00-Jan-00										HH	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
HH		25-Nov-98			8200		16594	00-Jan-00										HH	
HH		25-Nov-98			3800		16593	00-Jan-00										HH	
HH		25-Nov-98			270		16591	00-Jan-00										HH	
HH		04-Dec-98			9400		16649	00-Jan-00										HH	
HH		04-Dec-98			1100		11347	00-Jan-00										HH	
HH		04-Dec-98			230		11351	00-Jan-00										HH	
HH		04-Dec-98			3600		11387	00-Jan-00										HH	
HH		04-Dec-98		>	200000		16675	00-Jan-00										HH	
HH		04-Dec-98			5900		16648	00-Jan-00										HH	
HH		04-Dec-98			120000		11148	00-Jan-00										HH	
HH		11-Dec-98			16000		11142	00-Jan-00										HH	
HH		11-Dec-98			21000		90010	00-Jan-00										HH	
HH		11-Dec-98			14000		15847	00-Jan-00										HH	
HH		11-Dec-98			51000		11188	00-Jan-00										HH	
HH		11-Dec-98			53000		11360	00-Jan-00										HH	
HH		11-Dec-98			45000		11356	00-Jan-00										HH	
HH		11-Dec-98			72000		90013	00-Jan-00										HH	
HH		11-Dec-98			56000		16597	00-Jan-00										HH	
HH		18-Dec-98			2300		93151	00-Jan-00										HH	
HH		18-Dec-98		>	200000		16595	00-Jan-00										HH	
HH		18-Dec-98			16000		16594	00-Jan-00										HH	
HH		18-Dec-98			57000		16593	00-Jan-00										HH	
HH		18-Dec-98			560		16591	00-Jan-00										HH	
HH		23-Dec-98			380		16649	00-Jan-00										HH	
HH		23-Dec-98			720		11347	00-Jan-00										HH	
HH		23-Dec-98			12000		16675	00-Jan-00										HH	
HH		23-Dec-98			2800		11387	00-Jan-00										HH	
HH		23-Dec-98			1100		11351	00-Jan-00										HH	
HH		23-Dec-98			17000		16648	00-Jan-00										HH	
HH		23-Dec-98			59000		11148	00-Jan-00										HH	
HH		31-Dec-98			440		11142	00-Jan-00										HH	
HH		31-Dec-98			63		90010	00-Jan-00										HH	
HH		31-Dec-98			140		15847	00-Jan-00										HH	
HH		31-Dec-98			15000		11188	00-Jan-00										HH	
HH		31-Dec-98			6000		11360	00-Jan-00										HH	
HH		31-Dec-98			630		11356	00-Jan-00										HH	
HH		31-Dec-98			440		90013	00-Jan-00										HH	
HH		31-Dec-98			38000		16597	00-Jan-00										HH	
PW&E97	BUD9701	06-Jan-97	31616		190		11364											HP	
PW&E97	BUE9701	06-Jan-97	31616		72		11163											HP	
PW&E97	WOM9701	27-Jan-97	31616		3900		11385											HP	
PW&E97	WOK9701	27-Jan-97	31616		4600		15825											HP	
PW&E97	WOL9721	27-Jan-97	31616		6800		15824											HP	
PW&E97	WOB9702	04-Feb-97	31616		450		15831											HP	
PW&E97	WOC9702	04-Feb-97	31616		490		15830											HP	
PW&E97	WOD9702	04-Feb-97	31616		10000		15829											HP	
PW&E97	WOE9702	04-Feb-97	31616		15000		11390											HP	
PW&E97	WOF9702	04-Feb-97	31616		6000		11391											HP	
PW&E97	WOG9702	04-Feb-97	31616		3600		15828											HP	
PW&E97	WOJ9702	04-Feb-97	31616		4500		15826											HP	
PW&E97	WOM9702	04-Feb-97	31616		3600		11385											HP	
PW&E97	WOK9702	04-Feb-97	31616		4000		15825											HP	
PW&E97	WOL9722	04-Feb-97	31616		8300		15824											HP	
PW&E97	WOB9704	02-Apr-97	31616		3200		15831											HP	
PW&E97	WOC9704	02-Apr-97	31616		3300		15830											HP	
PW&E97	WOD9704	02-Apr-97	31616		3900		15829											HP	
PW&E97	WOE9704	02-Apr-97	31616		4300		11390											HP	
PW&E97	WOF9704	02-Apr-97	31616		5800		11391											HP	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
PW&E97	WOG9704	02-Apr-97	31616		4400		15828											HP	
PW&E97	WOJ9704	02-Apr-97	31616		2100		15826											HP	
PW&E97	WOM9704	02-Apr-97	31616		10000		11385											HP	
PW&E97	WOK9704	02-Apr-97	31616		2500		15825											HP	
PW&E97	WOL9724	02-Apr-97	31616		7794		15824											HP	
PW&E97	WOB9705	07-May-97	31616		490		15831											HP	
PW&E97	WOC9705	07-May-97	31616		780		15830											HP	
PW&E97	WOD9705	07-May-97	31616		440		15829											HP	
PW&E97	WOE9705	07-May-97	31616		690		11390											HP	
PW&E97	WOF9705	07-May-97	31616		660		11391											HP	
PW&E97	WOG9705	07-May-97	31616		2600		15828											HP	
PW&E97	WOJ9705	07-May-97	31616		3300		15826											HP	
PW&E97	WOM9705	07-May-97	31616		560		11385											HP	
PW&E97	WOK9705	07-May-97	31616		3800		15825											HP	
PW&E97	WOL9725	07-May-97	31616		2245		15824											HP	
PW&E97	BUF9701	06-Jan-97	31616		700		11363											HP	
PW&E97	BUG9701	06-Jan-97	31616		460		15847											HP	
PW&E97	BUH9701	06-Jan-97	31616		430		11362											HP	
PW&E97	BUJ9701	06-Jan-97	31616		140		11361											HP	
PW&E97	BUJ9701	06-Jan-97	31616		270		11360											HP	
PW&E97	BUK9701	06-Jan-97	31616		390		11359											HP	
PW&E97	BUL9701	06-Jan-97	31616		350		15846											HP	
PW&E97	BUM9701	06-Jan-97	31616		320		11357											HP	
PW&E97	BUN9701	06-Jan-97	31616		90		15845											HP	
PW&E97	BUO9701	06-Jan-97	31616		160		11354											HP	
PW&E97	BUP9701	06-Jan-97	31616		390		11353											HP	
PW&E97	BUQ9701	06-Jan-97	31616		370		15844											HP	
PW&E97	BUA9701	06-Jan-97	31616		770		11351											HP	
PW&E97	BUS9701	06-Jan-97	31616		1000		15843											HP	
PW&E97	WOL9701	06-Jan-97	31616		9500		15824											HP	
PW&E97	BUV9701	06-Jan-97	31616		2000		11345											HP	
PW&E97	BUW9701	06-Jan-97	31616		790		15841											HP	
PW&E97	BUX9701	06-Jan-97	31616		720		15840											HP	
PW&E97	BUD9702	03-Feb-97	31616		200		11364											HP	
PW&E97	BUE9702	03-Feb-97	31616		12000		11163											HP	
PW&E97	BUF9702	03-Feb-97	31616		3000		11363											HP	
PW&E97	BUG9702	03-Feb-97	31616		2000		15847											HP	
PW&E97	BUH9702	03-Feb-97	31616		3500		11362											HP	
PW&E97	BUJ9702	03-Feb-97	31616		700		11361											HP	
PW&E97	BUJ9702	03-Feb-97	31616		360		11360											HP	
PW&E97	BUK9702	03-Feb-97	31616		330		11359											HP	
PW&E97	BUL9702	03-Feb-97	31616		300		15846											HP	
PW&E97	BUM9702	03-Feb-97	31616		370		11357											HP	
PW&E97	BUN9702	03-Feb-97	31616		140		15845											HP	
PW&E97	BUO9702	03-Feb-97	31616		180		11354											HP	
PW&E97	BUP9702	03-Feb-97	31616		460		11353											HP	
PW&E97	BUQ9702	03-Feb-97	31616		330		15844											HP	
PW&E97	BUA9702	03-Feb-97	31616		660		11351											HP	
PW&E97	BUS9702	03-Feb-97	31616		890		15843											HP	
PW&E97	WOL9702	03-Feb-97	31616		7500		15824											HP	
PW&E97	BUV9702	03-Feb-97	31616		2400		11345											HP	
PW&E97	BUW9702	03-Feb-97	31616		800		15841											HP	
PW&E97	BUX9702	03-Feb-97	31616		810		15840											HP	
PW&E97	BUD9703	31-Mar-97	31616		1400		11364											HP	
PW&E97	BUE9703	31-Mar-97	31616		410		11163											HP	
PW&E97	BUF9703	31-Mar-97	31616		1500		11363											HP	
PW&E97	BUG9703	31-Mar-97	31616		5200		15847											HP	
PW&E97	BUH9703	31-Mar-97	31616		5600		11362											HP	

Database	TAG	END DATE	STORET CODE	GT LT	VALUE	remark	STATION ID	END TIME	END DEPTH	START DATE	START TIME	START DEPTH	CATEGORY	CALC.	TYPE	COMMENT	SOURCE 1	SOURCE 2	PROGRAM
PW&E97	BUI9703	31-Mar-97	31616		4000		11361											HP	
PW&E97	BUJ9703	31-Mar-97	31616		2500		11360											HP	
PW&E97	BUK9703	31-Mar-97	31616		7900		11359											HP	
PW&E97	BUL9703	31-Mar-97	31616		5400		15846											HP	
PW&E97	BUM9703	31-Mar-97	31616		6300		11357											HP	
PW&E97	BUN9703	31-Mar-97	31616		4600		15845											HP	
PW&E97	BUO9703	31-Mar-97	31616		7300		11354											HP	
PW&E97	BUP9703	31-Mar-97	31616		6800		11353											HP	
PW&E97	BUQ9703	31-Mar-97	31616		15000		15844											HP	
PW&E97	BUA9703	31-Mar-97	31616		16000		11351											HP	
PW&E97	BUS9703	31-Mar-97	31616		4500		15843											HP	
PW&E97	WOL9703	31-Mar-97	31616		12000		15824											HP	
PW&E97	BUV9703	31-Mar-97	31616		17000		11345											HP	
PW&E97	BUW9703	31-Mar-97	31616		28000		15841											HP	
PW&E97	BUX9703	31-Mar-97	31616		6693		15840											HP	
PW&E97	BUD9705	05-May-97	31616		180		11364											HP	
PW&E97	BUE9705	05-May-97	31616		140		11163											HP	
PW&E97	BUF9705	05-May-97	31616		130		11363											HP	
PW&E97	BUG9705	05-May-97	31616		340		15847											HP	
PW&E97	BUH9705	05-May-97	31616		6900		11362											HP	
PW&E97	BUI9705	05-May-97	31616		4900		11361											HP	
PW&E97	BUJ9705	05-May-97	31616		3700		11360											HP	
PW&E97	BUK9705	05-May-97	31616		500		11359											HP	
PW&E97	BUL9705	05-May-97	31616		520		15846											HP	
PW&E97	BUM9705	05-May-97	31616		560		11357											HP	
PW&E97	BUN9705	05-May-97	31616		430		15845											HP	
PW&E97	BUO9705	05-May-97	31616		240		11354											HP	
PW&E97	BUP9705	05-May-97	31616		430		11353											HP	
PW&E97	BUQ9705	05-May-97	31616		210		15844											HP	
PW&E97	BUA9705	05-May-97	31616		3700	BM	11351								BM			HP	
PW&E97	BUS9705	05-May-97	31616		380		15843											HP	
PW&E97	WOL9705	05-May-97	31616		2700		15824											HP	
PW&E97	BUV9705	05-May-97	31616		3500		11345											HP	
PW&E97	BUW9705	05-May-97	31616		27000		15841											HP	
PW&E97	BUX9705	05-May-97	31616		530		15840											HP	
PW&E97	BUD9706	22-Jun-97	31616		3600		11364											HP	
PW&E97	BUE9706	22-Jun-97	31616		3100		11163											HP	
PW&E97	BUF9706	22-Jun-97	31616		1100		11363											HP	
PW&E97	BUG9706	22-Jun-97	31616		3300		15847											HP	
PW&E97	BUH9706	22-Jun-97	31616		3700		11362											HP	
PW&E97	BUI9706	22-Jun-97	31616		3100		11361											HP	
PW&E97	BUJ9706	22-Jun-97	31616		2400		11360											HP	
PW&E97	BUL9706	22-Jun-97	31616		2600		15846											HP	
PW&E97	BUM9706	22-Jun-97	31616		2700		11357											HP	
PW&E97	BUN9706	22-Jun-97	31616		2100		15845											HP	
PW&E97	BUO9706	22-Jun-97	31616		2800		11354											HP	
PW&E97	BUP9706	22-Jun-97	31616		2200		11353											HP	
PW&E97	BUQ9706	22-Jun-97	31616		6000		15844											HP	
PW&E97	BUA9706	22-Jun-97	31616		5400	BM	11351								BM			HP	
PW&E97	BUS9706	22-Jun-97	31616		1300		15843											HP	
PW&E97	WOL9706	22-Jun-97	31616		3500		15824											HP	
PW&E97	BUV9706	22-Jun-97	31616		3400		11345											HP	
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APPENDIX D

QUALITY ASSURANCE PROGRAM PLAN (QAPP)

**Total Maximum Daily Loads for Fecal Pathogens in
Buffalo Bayou and Whiteoak Bayou
Quality Assurance Project Plan
Revision 4**

*University of Houston
Houston, TX 77204-4003*

Total Maximum Daily Load Program
Texas Natural Resource Conservation Commission
P.O. Box 13087, MC - 150
Austin, Texas 78711-3087

Effective Period June 2001 to May 2002

Questions concerning this quality assurance project plan should be directed to:

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(713) 743-4271
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A1 Approval Page

Total Maximum Daily Loads for Fecal Pathogens in Buffalo Bayou and Whiteoak Bayou

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Sharon Coleman, TMDL Quality Assurance Specialist

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**Office of Environmental Policy, Analysis, and Assessment
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Strategic Implementation Plans Section

Program Manager
TMDL Team

Andrew Sullivan, Project Manager
TMDL Team

University of Houston/PBS&J

Hanadi Rifai, Project Manager
University of Houston

Paul Jensen, Project Manager
PBS&J

Adrienne Boer, Quality Assurance Officer
PBS&J

Note: The University of Houston/PBS&J Quality Assurance Officer will secure written documentation (such as the letter in Appendix H) from each sub-tier project participant (e.g., subcontractors, other units of government, laboratories) stating the organization's awareness of and commitment to requirements contained in this quality assurance project plan and any amendments or revisions of this plan. The Quality Assurance Officer will maintain the documentation as part of the project's quality assurance records, and will ensure that the document is available for review.

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A3 Distribution List

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Note: The University of Houston Data Manager will provide copies of this project plan and any amendments or revisions of this plan to each sub-tier project participant, e.g., subcontractors, other units of government, laboratories. The University of Houston/PBS&J Quality Assurance Officer will document receipt of the plan by sub-tier participants and maintain this documentation as part of the project's quality assurance records. This documentation will be available for review.

List of Acronyms

AVS	Acid Volatile Sulfide
BAT	Best Available Technology
BCT	Best Conventional Technology
BMP	Best Management Practice
BPJ	Best Professional Judgement
CBOD ₅	5-day Carbonaceous Biochemical Oxygen Demand
CFR	Code of Federal Regulations
CFU	Colony-Forming Unit of bacteria
COC	Chain of Custody
COD	Chemical Oxygen Demand
CRM	Certified Reference Material
CRP	Clean Rivers Program
CSO	Combined Sewer Overflow
CWA	Clean Water Act
DMP	Data Management Plan
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon
DQO	Data Quality Objective
EC	<i>Escherichia coli</i>
EPA	Environmental Protection Agency

FC	Fecal coliform
FDA	Food and Drug Administration, US
FR	Federal Register
FRPD	Relative Percent Deviation of Field samples
GC	Gas Chromatography
GIMS	Geographic Information and Management System (City of Houston)
GPS	Global Positioning System
HCFC	Harris County Flood Control District
HCPC	Harris County Pollution Control
H&HS	Health and Human Services (City of Houston)
IC	Ion Chromatography
LA	Load Allocation
LC	Loading Capacity
LDPE	Low Density Polyethylene
LIMS	Laboratory Information Management System
LRPD	Relative Percent Deviation of Laboratory samples
MAL	Minimum Analytical Level, equivalent to EPA's Minimum Level
MDL	Method Detection Limit
MOS	Margin of Safety
MPN	Most Probable Number
MS	Mass Spectrometry
MSD	Matrix Spike Duplicate
NCMP	National Coastal and Marine Policy
	National Estuary Program

NEP	
NIST	National Institute of Science and Technology
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
PES	Performance Evaluation Sample
POTW	Publicly Owned Treatment Works
PW&E	Public Works and Engineering (City of Houston)
QA/QC	Quality Assurance/Quality Control
QAM	Quality Assurance Management
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QAS	Quality Assurance Specialist
QMP	Quality Management Plan
RPD	Relative Percent Deviation
RWA	Receiving Water Assessment
SOP	Standard Operating Procedure
SPM	Suspended Particulate Matter
SRM	Standard Reference Material
STORET	Storage and Retrieval
SWQM	Surface Water Quality Monitoring
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load

TNRCC	Texas Natural Resource Conservation Commission
TOC	Total Organic Carbon
TPDES	Texas Pollutant Discharge Elimination System
TRACS	Texas Regulatory and Compliance System
TSD	Technical Support Document
TSS	Total Suspended Solids
TSWQS	Texas Surface Water Quality Standards
USGS	United States Geological Survey
WBS	Waterbody System
WLA	Wasteload Allocation
WQMP	Water Quality Management Plan
WMT	Watershed Management Team
WWTP	Wastewater Treatment Plant

A4 Project/Task Organization

TNRCC

Compliance Support Division

Sharon Coleman

TMDL Quality Assurance Specialist

Assists the TNRCC Project Manager in QA related issues. Reviews the QAPP to ensure projects meet stated objectives. Conveys quality related problems to an appropriate TNRCC manager. Coordinates or performs audits, as deemed necessary and using wide variety of assessment guidelines and tools. Provides a point of contact at the TNRCC to resolve QA issues.

Monitoring Operations Division

Water Data Manager

Receives quality-assured data in specified electronic format and loads these data into the Texas Regulatory and Compliance System (TRACS) database. Maintains records of data submission and returns incorrect or erroneous submissions TMDL Project Manager for resolution. Serves as Monitoring Operations data management customer service representative for the TNRCC Project Manager. Provides training to the TNRCC TMDL Project Manager to ensure proper data submittal.

Strategic Assessment Division

TNRCC TMDL Program Manager

Responsible for oversight of the TNRCC TMDL Program. Oversees the development of QA guidance for the TMDL Team to be sure it is within pertinent frameworks of the TNRCC. Reviews and approves all TMDL Projects, QA audits, corrective actions, reports, work plans, and contracts. Enforces corrective action, as required, where QA protocols are not met. Ensures that all TNRCC TMDL personnel are fully trained, and TMDL projects are adequately staffed.

Andrew Sullivan
TNRCC TMDL Project Manager

Responsible for ensuring that the project delivers data of known acceptable quality, quantity, and type on schedule to achieve project objectives. Provides the primary point of contact between the University of Houston/PBS&J and the TNRCC. Tracks deliverables to ensure that tasks in the work plan are completed as specified in the contract. Assists TNRCC QAS in technical review of the QAPP. Responsible for verifying that the QAPP is followed by the University of Houston/PBS&J. Notifies the TNRCC QAS of particular circumstances, which may adversely affect the quality of data derived from the collection and analysis of samples.

Field Operations Division

Steve Smith
TNRCC Regional Office TMDL Liaison

Assists in the development of the water quality monitoring plan. Ensures that the water quality monitoring plan in Appendix B adequately represents the local water quality conditions that may account for the observed impairment. Works with the University of Houston/PBS&J to resolve problems with water quality monitoring. Maintains contact with TNRCC Project Manager to ensure coordination of issues.

University of Houston/PBS&J

Hanadi Rifai
University of Houston Project Manager

The University of Houston Project Manager is responsible for ensuring that tasks and other requirements in the contract are executed on time and with the quality assurance/ quality control requirements in the system as defined by the contract and in the QAPP; assessing the quality of subcontractor/participant work; submitting accurate and timely deliverables to the TNRCC Project Manager; and coordinating attendance at conference calls, training, meetings, and related project activities with the TNRCC. Responsible for verifying that the QAPP is followed by the University of Houston and sub-tier participants. Responsible for verifying that the project is producing data of known and acceptable quality. Responsible for ensuring adequate training and supervision of all activities involved in generating analytical data, corrective action taken as well as facilitating internal audits.

Paul Jensen
PBS&J Project Manager

Responsible for ensuring that tasks performed by PBS&J are executed on time and with the quality assurance/ quality control requirements in the system as defined by the contract and in the QAPP; submitting accurate and timely deliverables to the University of Houston Project Manager; and coordinating attendance at conference calls, training, meetings, and related project activities with the

University of Houston. Responsible for verifying that the project is producing data of known and acceptable quality. Responsible for ensuring adequate training and supervision of all activities involved in generating analytical data, corrective action taken as well as facilitating internal audits.

Adrienne Boer

Quality Assurance Officer

Responsible for coordinating development and implementation of the University of Houston/PBS&J's QA program. Responsible for writing and maintaining QAPPs. Responsible for maintaining records of QAPP distribution, including appendices and amendments. Responsible for maintaining written records of sub-tier commitment to requirements specified in this QAPP. Responsible for identifying, receiving, and maintaining project quality assurance records. Responsible for compiling and submitting the QA report. Responsible for coordinating with the TNRCC QAS to resolve QA related issues. Notifies the University of Houston Project Manager and TNRCC Project Manager of particular circumstances which may adversely affect the quality of data. Responsible for the validation of data prior to the submission of data to the TNRCC. Coordinates the research and review of technical QA material and data related to water quality monitoring system design and analytical techniques. Conducts laboratory inspections. Develops, facilitates, and conducts monitoring systems audits. Responsible for performing and documenting a minimum 10% validation and verification of all data collected in accordance with Table 4 and acquired data procedures after each task is performed.

Monica Suarez

University of Houston Data Manager

Responsible for the acquisition, verification, and transfer of data to the TNRCC. Oversees data management for the study. Performs data quality assurances prior to transfer of data to TNRCC. Responsible for transferring data to the TNRCC in the acceptable format. Ensures that the database review checklist is filled out and data submitted with appropriate codes and data.

Tina Petersen

University of Houston Field Supervisor

Responsible for supervising all aspects of the sampling and measurement of surface waters and other parameters in the field. Responsible for the acquisition of water samples and field data measurements in a timely manner that meet the quality objectives specified in Section A7 (Table 1), as well as the requirements of Sections B1 through B8. Responsible for field scheduling, staffing, and ensuring that staff is appropriately trained as specified in Sections A6 and A8. Coordinates any joint monitoring with the TNRCC Project Manager and TNRCC Regional Office TMDL Liason. Reports status, problems, and progress to the University of Houston Project Manager.

Deborah Roberts

University of Houston Laboratory Manager

Responsible for supervision of laboratory personnel involved in generating analytical data for this project. Responsible for ensuring that laboratory personnel involved in generating analytical data have

adequate training and a thorough knowledge of the QAPP and all SOPs specific to the analyses or task performed and/or supervised. Responsible for oversight all operations ensuring that all QA/QC requirements are met and documentation related to the analysis is completely and accurately reported. Enforces corrective action, as required.

Deborah Roberts

University of Houston Laboratory Quality Assurance Officer

Monitors the implementation of the QAM/QAP within the laboratory to ensure complete compliance with QA objectives as defined by the contract and in the QAPP. Conducts in-house audits to identify potential problems and ensure compliance with written SOPs. Responsible for supervising and verifying all aspects of the QA/QC in the laboratory. Performs validation and verification of data before the report is sent to the contractor. Insures that all QA reviews are conducted in a timely manner from real-time review at the bench during analysis to final pass-off of data to the QA officer.

Ka-Leung Lee

PBS&J Data Manager

Responsible for the acquisition, verification, and transfer of data to the University of Houston. Performs data quality assurances prior to transfer of data to the University of Houston. Ensures that the database review checklist is filled out and data submitted with appropriate codes and data. Provides the point of contact for the University of Houston Data Manager to resolve issues related to the data.

Martin Heaney

PBS&J Field Supervisor

Responsible for supervising all aspects of the sampling and measurement of surface waters and other parameters in the field. Responsible for the acquisition of water samples and field data measurements in a timely manner that meet the quality objectives specified in Section A7 (Table 1), as well as the requirements of Sections B1 through B8. Responsible for field scheduling, staffing, and ensuring that staff is appropriately trained as specified in Sections A6 and A8. Coordinates any joint monitoring with the TNRCC Project Manager and TNRCC Regional Office TMDL Liason. Reports status, problems, and progress to the PBS&J Project Manager.

Steve Grychka

North Water District Lab Services, Laboratory Manager

Responsible for supervision of laboratory personnel involved in generating analytical data for this project. Responsible for ensuring that laboratory personnel involved in generating analytical data have adequate training and a thorough knowledge of the QAPP and all SOPs specific to the analyses or task performed and/or supervised. Responsible for oversight all operations ensuring that all QA/QC requirements are met and documentation related to the analysis is completely and accurately report. Enforces corrective action, as required.

Steve Grychka

North Water District Lab Services, Laboratory Quality Assurance Officer

Monitor the implementation of the quality assurance management plan within the laboratory to ensure complete compliance with QA objectives as defined by the contract and in the QAPP. Conduct in-house audits to identify potential problems and ensure compliance with written SOPs. Responsible for supervising and verifying all aspects of the QA/QC in the laboratory. Perform validation and verification of data before the report is sent to the contractor. Insures that all QA reviews are conducted in a timely manner from real-time review at the bench during analysis to final pass-off of data to the QA officer.



A5 Problem Definition

The TNRCC implements the statewide approach for watershed management in Texas to improve the efficiency, effectiveness, and continuity of water quality management programs. The approach, which is summarized in *The Statewide Watershed Management Approach for Texas: The TNRCC's Framework for Implementing Water Quality Management* (TNRCC, 1997), establishes the state's process for managing water quality. It focuses on assessing watershed conditions for all waters of the state and implementing solutions where improvement is necessary. The primary goal of the approach is to ensure that management efforts provide a safe, clean, affordable water supply and healthy aquatic ecosystems for Texas.

The Total Maximum Daily Load Program, a major component of the approach, addresses impaired or threatened streams, lakes, and estuaries (water bodies). The primary objective of the TMDL Program is to restore and maintain the beneficial uses of impaired or threatened water bodies. The Federal Clean Water Act §303(d) list identifies "impaired" water bodies not meeting applicable water quality standards for their designated uses and requiring development of Total Maximum Daily Loads (TMDLs) for contaminants of concern. In general, a TMDL is the total amount of a pollutant that a water body can assimilate and still meet state water quality standards. The term also refers to the assessment necessary to establish an acceptable pollutant load for an impaired water body and to allocate the load between contributing point, nonpoint, and natural background sources of pollutants in the watershed. Thus, water quality monitoring and other assessment activities are an integral part of the TMDL.

Segments 1013, 1014 and 1017 have been identified in the 303(d) list as impaired due to elevated levels of fecal coliforms that can negatively impact contact recreation. Consequently, a TMDL study for fecal pathogens in Buffalo and Whiteoak Bayous is being developed. As part of the bacteria TMDL project, the University of Houston and PBS&J will collect field data on concentrations and dynamics of fecal pathogens in the segments of concern to assess sources, current contamination levels and trends. The monitoring will have four main components, which are monitoring of point sources under dry-weather conditions, assessment of illicit discharge locations, sampling of moderate run-off in tributaries and main stream for model calibration, and analysis of bacteria dynamics in the bayous.

This QAPP addresses the monitoring program for the TMDL project. The purpose of the QAPP is to clearly delineate the tasks, management structure, and policies which will be used to implement the QA requirements necessary to document the reliability and validity of environmental data. The QAPP is reviewed by the TNRCC to ensure that data generated for the purposes described above are scientifically valid and legally defensible. This process will insure that all data submitted to the statewide database have been collected and analyzed in a way that guarantees its reliability and therefore can be used in TMDL development, stream standards modifications, permit decisions, and water quality assessments.

A6 Project/Task Description and Schedule

See Appendix A for the work plan tasks and schedule of deliverables for this project. This QAPP covers the water quality monitoring tasks described in the work plan. No decisions will be made by the project team based on the data collected. These data, and data collected by other organizations (e.g. USGS, TNRCC, etc.), will be subsequently analyzed and used by the TNRCC for TMDL development.

See Appendix B for sampling locations and scheduling for the monitoring to be conducted under this QAPP.

Revisions to the QAPP

Until the work described is completed, this QAPP shall be revised as necessary and reissued annually on the anniversary date, or revised and reissued within 120 days of significant changes, whichever is sooner. The last approved versions of QAPPs shall remain in effect until revised versions have been approved, if revised version has been submitted for review before expedition of approved version. If the entire QAPP is current, valid, and accurately reflects the project goals and the organization's policy, the annual re-issuance may be done by a certification that the plan is current, to include a copy of new, signed approval pages for the QAPP.

Expedited Changes

Expedited Changes to the QAPP may be approved to reflect changes in project organization, tasks, schedules, objectives, and methods, address deficiencies and non-conformance, improve operational efficiency; and accommodate unique or unanticipated circumstances. Requests for expedited changes are directed from the University of Houston Project Manager to the TNRCC Project Manager in writing. They are effective immediately upon approval by the TNRCC Project Manager and Quality Assurance Specialist, or their designees. Expedited changes to the QAPP and the reasons for the changes shall be documented, and revised pages shall be initialed by the TNRCC Project Manager and QAS and University of Houston Project Manager, then distributed to all persons on the QAPP distribution list by the University of Houston/PBS&J QAO.

Expedited changes shall be reviewed, approved, and incorporated into a revised QAPP during the annual revision process or within 120 days of the initial approval in cases of significant changes.

Personnel and Equipment Requirements

See Sections A8 and B6.

Assessment Techniques

See section C1 for a listing of project assessments.

Quality Assurance Records

See section A9 for a listing of project quality assurance documents and records.

A7 Quality Objectives and Criteria for Measurement Data

The project objective is to collect data that comply with TNRCC rules for surface water quality monitoring programs, to support decisions related to bacteria TMDL development for the Buffalo and Whiteoak Bayous. Fecal coliform (FC) and *Escherichia coli* (EC), the official bacterial indicators for past and current Texas water quality standards, will be measured in several locations across segments 1013, 1014 and 1017. Conventional water chemistry and field-measured parameters (e.g. pH, temperature, DO, turbidity, conductivity, salinity, NH₃-N, and PO₄-P) as well as flow severity, TSS will also be measured to find any correlation among these parameters and to understand how levels of the bacterial indicators change with flow. In addition, samples collected at point sources (at a point following the chlorine contact chamber as it is flowing over the weir) will be analyzed for residual chlorine. EC will also be measured in some sediment samples to try to establish a baseline of bacterial contamination in the sediments. The measurement performance criteria to support the project objective are specified in Table 1.

Precision

The precision of laboratory data is a measure of the reproducibility of a measurement when an analysis is repeated. It is strictly defined as a measure of the closeness with which multiple analyses of a given sample agree with each other. Precision is assessed by replicate analyses, by repeated analyses of a stable standard. Precision is specified by the relative percent deviation of the results.

$$RPD = \{ (X_1 - X_2) / [(X_1 + X_2) / 2] \} * 100$$

For microbiological analyses, the method to be used for calculating precision is the one outlined in Standard Methods 20th Edition section 9020 B.8.b.

$$RPD_{\text{bacteria}} = (\log X_1 - \log X_2)$$

The RPD_{bacteria} should be lower than 3.27 SR_{log}/n, where R_{log} is the difference in the natural log of duplicates for the first 15 positive samples.

Performance control limits for analytical measurements are specified in Table 1. Performance limits for field duplicates are defined in Section B5.

Accuracy

Accuracy is a statistical measurement of correctness and includes components of systemic error. A measurement is considered accurate when the value reported does not differ from the true value. Accuracy is verified through the analysis of laboratory matrix spikes and certified reference materials are specified in Table 1. Performance limits for blank analyses are discussed in Section B5.

Representativeness

A small part of the data collected under the TMDL Program will be considered representative of ambient water quality conditions. Representativeness is a measure of how accurately a monitoring program reflects the actual water quality conditions. The representativeness of the data is dependent on 1) data quality objectives, 2) the sampling locations, 3) the number of samples collected, 4) the number of years and seasons when sampling is performed, 5) the number of depths sampled, and 6) the sampling procedures. Appropriate site selection and sampling of all pertinent media (water, sediment, and biota) and use of only approved analytical methods will assure that the measured data represent the conditions at the site. The goal for meeting total representation of the water body is tempered by the availability of time and funding and the objectives of the data collection. Representativeness will be measured with the completion of sample collection in accordance with the approved QAPP.

Comparability

Only approved procedures, as described in this QAPP, will be used for field sampling and laboratory analyses to assure the comparability of the data. In addition, for an accurate analysis to be conducted, reporting units will be consistent for the dataset, accepted rules for rounding figures will be applied, and data will be reported in a standard format as specified in the Data Management Plan (Appendix E).

Completeness

The completeness of the data is basically a relationship of how much of the data are available for use compared to the total potential data. Ideally, 100% of the data should be available. However, the possibility of unavailable data due to accidents, insufficient sample volume, broken or lost samples, etc. is to be expected. Therefore, it will be a general goal of the project that 90% data completion is achieved.

Table 1 - Data Quality Objectives for Measurement Data

PARAMETER	UNITS	METHOD TYPE	METHOD	METHOD DESCRIPTION	STORET	MAL	PRECISION of laboratory duplicates (RPD)	ACCURACY of matrix spikes % Recovery	ACCURACY CRM	PERCENT COMPLETE
Field Parameters										
pH	pH units		EPA 150. land TNRCC SOP		00400	1.0	10	NA	NA	90
DO	mg/L		EPA 360. land TNRCC SOP		00300	1.0	10	NA	NA	90
Conductivity	mS/cm		EPA 120. land TNRCC SOP		00094	1	10	NA	NA	90
Temperature	° Celcius		EPA 170. land TNRCC SOP		00010	NA	10	NA	NA	90
Flow	cfs		TNRCC SOP		00061	NA	10	NA	NA	90
Flow Severity	1-no flow, 2-low, 3-normal, 4-flood, 5-high, 6-dry	TNRCC SOP	TNRCC SOP ²		01351	NA	NA	NA	NA	90
Conventional parameters										
TSS	mg/L	gravimetric	EPA 160.2		00530	4.0	20	NA	NA	90
TOC	mg/L	oxidation	EPA 415.2		00680	0.1	20	80-120	NA	90
Residual chlorine	mg/L	DPD colorimetric	Std. Methods 400-Cl G/ HACH Method 8021		50060	0.01	20	80-120		90
Ammonia-N	mg/L	Colorimetric, salicylate	HACH Methods 10023(low range) and 10031 (high range)			0.02	20	80-120		90

PARAMETER	UNITS	METHOD TYPE	METHOD	METHOD DESCRIPTION	STORET	MAL	PRECISION of laboratory duplicates (RPD)	ACCURACY of matrix spikes % Recovery	ACCURACY CRM	PERCENT COMPLETE
<i>o</i> -Phosphorous	mg/L	colorimetric, absorbic acid	EPA 365.3/ HACH Method 8048		00671	0.01	20	80-120		90
Turbidity	NTU	nephelometric	EPA 180.1		82079		20	NA		90
Carbonaceous Biochemical Oxygen Demand	mg/L	potentiometric	Std. Methods 5210-B		80082		25	NA		90
FC in water	cfu/100 mL	membrane filter, mFC	Std. Methods 9222-D	membrane filter, mFC	31616	1	3.27* SR _{log} /n	NA		90
EC in water	MPN/100 mL	Alternate Direct	IDEXX Colilert	IDEXX MPN Quantitray 2000	31699	1	3.27* SR _{log} /n	NA		90
EC in sediment ³	cfu/100 g	Resuspension in water with subsequent mTEC		membrane filter, mTEC	31702	1	3.27* SR _{log} /n	NA		90
Sediment grain size analysis	% dry weight 0.0039-0.0625 mm	TNRCC SOP	Fract.separation/gravimetric determination		82008	NA	NA	NA		90
Sediment grain size analysis	% dry weight < 0.0039 mm	TNRCC SOP	Fract.separation/gravimetric determination		82009	NA	NA	NA		90
Sediment grain size analysis	% dry weight 0.0625- 2 mm	TNRCC SOP	Fract.separation/gravimetric determination		89991	NA	NA	NA		90

¹ Due to the dependence of rainfall occurrence at certain times, runoff samples will have a lesser percent of completeness

² TNRCC. 1999. Surface Water Quality Monitoring Procedures, pp. 2.16-2.17

³ Bacteria will be transferred from the sediment sample to an aqueous phase and subsequently analyzed using membrane filtration.

A8 Training Requirements/Certifications

UH/PBS&J personnel will be fully trained in all methods and procedures required in this QAPP. Documentation of any training classes will be maintained.

A9 Documentation and Records

The documents that describe, specify, report, or certify activities, requirements, procedures, or results for this project and the items and materials that furnish objective evidence of the quality of items or activities are listed.

Document/Record	Location	Retention	Form
QAPP, amendments, and appendices	Univ. of Houston	5 years	Paper
QAPP distribution documentation	Univ. of Houston	5 years	Paper
Field notebooks or field data sheets	Univ. of Houston	5 years	Paper
Field equipment calibration/maintenance logs	Univ. of Houston	5 years	Paper
Chain of custody records	Univ. of Houston.	5 years	Paper
Field SOPs	Univ. of Houston	5 years	Paper
Bacteriological field samples logs	Univ. of Houston	5 years	Paper
Media/incubation logs	Lab	5 years	Paper
Laboratory sample reception logs	Lab	5 years	Paper
Laboratory QA manuals	Lab	5 years	Paper
Laboratory SOPs	Univ. of Houston	5 years	Paper
Laboratory internal/external standards	Lab	5 years	Paper
Laboratory instrument performance	Lab	5 years	Paper
Laboratory initial demonstration of capability	Lab	5 years	Paper
Laboratory procedures	Lab	5 years	Paper
Instrument raw data files	Lab	5 years	LIMS Electronic
Instrument readings/printouts	Lab	5 years	Paper
Laboratory data reports	Univ. of Houston.	5 years	Paper
Laboratory data verification for integrity, precision, accuracy and validation	Lab	5 years	Paper
Laboratory equipment maintenance logs	Lab	5 years	Paper
Laboratory calibration records	Lab	5 years	LIMS Electronic
Laboratory corrective action documentation	Lab	5 years	Paper
University of Houston data base verification	Univ. of Houston	5 years	Electronic
Lead Organization data quality assurance/			
Quality control verification/validation	Univ. of Houston	5 years	Paper
Copy of data collected by other organizations	Univ. of Houston	5 years	Paper/Electronic
Training records	Univ. of Houston	3 years	Paper
Progress report/final report/data	U of H/TNRCC	3 years	Paper/Electronic

The TNRCC may elect to take possession of records at the conclusion of the specified retention period.

Special Reporting Formats

The University of Houston/PBS&J will use the formats from the TNRCC SWQM Program. Special reporting formats are included in the *SWQM Data Management Reference Guide*.

Case Narrative

A case narrative is not required for this project.

References

American Public Health Association, American Water Works Association, and Water Pollution Control Federation, 1999. *Standard Methods for the Examination of Water and Wastewater*. Eds. L. Clesceri, A. Eaton, and A. Greenberg. 20th Edition. American Public Health Association, Washington. DC.

TNRCC, 1999a. *Data Management Reference Guide, Surface Water Quality Monitoring* (or most current version).

TNRCC, 1999b. *Surface Water Quality Monitoring Procedures Manual, GI-252*, June 1999.

TNRCC, 1999c. *Program Guidance & Reference Guide FY 2000-2001, Texas Clean Rivers Program*.

Note: when references are made to documents that are not attached to the QAPP, the Project Manager of the University of Houston assumes responsibility for compliance of the documentation with the QAPP requirements.

B1 Sampling Process Design

See Appendix B for sampling process design information and monitoring tables associated with data collected under this QAPP.

B2 Sampling Methods Requirements

Field Sampling Procedures

The University of Houston and PBS&J will follow the field sampling procedures for field, biological, and conventional chemical parameters documented in the *TNRCC Surface Water Quality Monitoring Procedures Manual* (1999a) and the *TNRCC Receiving Water Assessment Procedures Manual* (1999b). Water samples will be collected manually in new, unused Whirlpak bags containing sodium thiosulfate for bacterial analysis. Additionally, water will be collected in 2-liter sterile glass bottles and transferred to a 1-L bottle to perform the respective field analyses, two 50 mL-bottles for TOC analysis (if pertinent), and two half-liter LDPE bottles for TSS analysis. Additionally, duplicate water samples will be collected in one gallon- cubitainers for CBOD₅ analysis, when appropriate. Sediment samples will be collected with a clean, washed Ekman dredge (pre-rinsed with native water) and the unconsolidated material at the top scraped off into a 500 g-pint glass jars for bacterial analyses. Additional procedures for field sampling outlined in this section reflect specific requirements for sampling under this TMDL Project and/or provide additional clarification.

Sample Volume, Container Types, Minimum Sample Volume, Preservation Requirements, and Holding Time Requirements.

Table 2. Field Sampling and Handling Procedures

Parameter	Matrix	Container	Preservation	Sample Volume	Holding Time
<i>o</i> -phosphorus	water	Pre-cleaned glass bottles	To be analyzed in the field		-
Ammonia-Nitrogen	water	Pre-cleaned glass bottles	To be analyzed in the field		-
Residual chlorine	water	Pre-cleaned glass bottles	To be analyzed in the field		-
CBOD ₅	water	Gallon cubitainer	4° C, add 1 g/L FAS crystals if residual chlorine present	1000 mL	48 hours
TSS	water	Pre-cleaned LDPE bottle	4° C, dark	400 mL	7 days
TOC	water	Pre-combusted borosilicate glass bottle	4° C, dark, pH<2 with H ₂ SO ₄	40 mL	28 days

Parameter	Matrix	Container	Preservation	Sample Volume	Holding Time
Turbidity	water	Pre-cleaned glass bottles	To be analyzed in the field		
FC	water	Sterile Whirlpak bags	4° C, dark	250 mL	6+2 hours ¹
EC	water	Sterile Whirlpak bags	4° C, dark	250 mL	6+2 hours ¹
EC	sediment	Pint glass jars with teflon liners	4° C, dark	500 g	6+2 hours ¹
Grain size analysis	sediment	Pint glass jars with teflon liners		500 g	

¹ This holding time represents 6 field hours and 2 lab hours

Processes to Prevent Cross Contamination

Procedures outlined in the TNRCC *Surface Water Quality Procedures Manual* describe the necessary steps to prevent cross-contamination of samples. These include such things as direct collection into sample containers, when possible; clean sampling techniques for metals; and certified containers for organics. Field QC samples as discussed in Section B5 are collected to verify that cross-contamination has not occurred.

Documentation of Field Sampling Activities

Field sampling activities are documented on field data sheets as presented in Appendix C. Flow work sheets, multi-probe calibration records, and records of bacteria analyses (if applicable) are part of the field data record. For all visits, station ID, location, sampling time, date, and depth and sample collector's name/signature are recorded. Values for all measured field parameters are recorded. Detailed observational data are recorded including water appearance, weather, biological activity, stream uses, unusual odors, specific sample information, missing parameters, days since last significant rainfall, and flow severity.

Recording Data

For the purposes of this section and subsequent sections, all personnel follow the basic rules for recording information as documented below:

1. Legible writing in indelible, waterproof ink with no modifications, write-overs or cross-outs;
2. Correction of errors with a single line followed by an initial and date;
3. Closeouts on incomplete pages with an initialed and dated diagonal line.

Deviations from Sampling Method Requirements or Sample Design, and Corrective Action

Examples of deviations from sampling method requirements or sample design include but are not limited to such things as inadequate sample volume due to spillage or container leaks, failure to preserve samples appropriately, contamination of a sample bottle during collection, storage temperature and holding time exceedance, sampling at the wrong site, etc. Any deviations will invalidate resulting data. Samples should be discarded and re-collected.

B3 Sampling Handling and Custody Procedures

Chain-of –Custody – The COC system described in this QAPP replaces the “tag” system as described in the SWQM Manual.

Proper sample handling and custody procedures ensure the custody and integrity of samples beginning at the time of sampling and continuing through transport, sample receipt, preparation, and analysis.

A sample is in custody if it is in actual physical possession or in a secured area that is restricted to authorized personnel. The COC form is used to document sample handling during transfer from the field to the laboratory and among contractors. The following information concerning the sample is recorded on the COC form (See Appendix D).

1. Date and time of collection
2. Site identification
3. Sample matrix
4. Number of containers
5. Preservative used or if the sample was filtered
6. Analyses required
7. Name of collector
8. Custody transfer signatures and dates and time of transfer
9. Name of laboratory admitting the sample
10. Bill of lading (if applicable)

The Chain of Custody will be attached to the Field Data Sheets.

Sample Labeling

Samples are labeled on the container (or on a label) with an indelible, waterproof marker. Label information includes the site identification, the date and time of sampling, and preservative added (if applicable).

Sample Handling

For all the analyses to be conducted, the sample containers will not be pre-rinsed.

EC analysis in water

Whirlpak bags containing sodium thiosulfate ($\text{Na}_2\text{S}_2\text{O}_3$) will be used to collect the FC samples to prevent interference by residual chlorine. Samples (in duplicate for point sources and illegal discharges) will be sealed and carried in ice chests from the point of collection (see Appendix A for a description of the point where the samples will be collected from) to the University of Houston laboratory/North Water District Laboratory Services. In addition, a bottle containing DI water will be packed with the samples for further checking of temperature. As soon as the samples are received, the temperature tester will be open and the temperature measured and recorded in a laboratory logbook. If the temperature exceeds 4°C , the samples will be discarded. Sample filtration will be initiated at most six hours after the sample is collected. To insure that the holding time criterion is met, the laboratory data manager will receive a copy of the field log format and will log in the samples at the laboratory including both time of collection and time of reception of each sample. If the time of reception exceeds six hours the sample will be discarded and a new sample will have to be collected at the respective location.

Filtering will start as soon as possible after the samples are logged in at the laboratory but in all cases in less than two hours. A new record will be added to the lab log format to indicate the time at which filtration is initiated. If the lab holding time exceeds 2 hours, or the overall holding time exceeds 8 hours, the sample will be discarded and re-collected. Samples will be left on ice until filtration is initiated. Sample size will be dictated based upon experience. It is anticipated that the average FC number will be between 1,000 to 10,000 cfu/100 mL. It is required that the sample volume yields between 20 and 60 cfu/ 100 mL. Based upon this expectation, sample size will need to be between 0.00002 mL to 0.001 mL to yield the optimum number of colonies. If the sample size is less than 1mL, dilutions will be prepared serially using sterile phosphate buffered water dilution blanks. Samples will be shaken vigorously at least 25 times prior to preparation of dilutions. Three different dilutions will be filtered of one sample (1:1, 1:10, and 1:100, or as determined after looking at historical data for each location), and three replicates will be prepared of each dilution. When sample aliquots of less than 20 mL are to be filtered, 10 mL of sterile buffer water will be added to the funnel before filtration.

Once a sample is filtered, incubation will be started. Prior to loading the incubator, the temperature will be set to $35 \pm 0.5^\circ\text{C}$. The incubation temperature as well as the time at which incubation started will be recorded in the lab logbook. Samples will be removed from the incubator after at least 22 hours of incubation and in any case prior to 26 hours of incubation. The time at which the samples are removed from the incubator will be recorded in the lab logbook. If the incubation time exceeds 26 hours, the sample will be discarded and a new sample will have to be collected. Counting will be initiated as soon as all the dilutions from one sample are removed from the incubator. Plates with too few (less than 20) or too many (more than 100) colonies will be discarded, but in any case they will be recorded in the lab logbook.

EC analysis in water

Whirlpak bags containing sodium thiosulfate ($\text{Na}_2\text{S}_2\text{O}_3$) will be used to collect the EC samples to prevent interference by residual chlorine. Samples (in duplicate for point sources) will be sealed and carried in ice chests from the point of collection to the laboratory or place where sealing and incubation are performed. The laboratory data manager will receive a copy of the field log format and will log in the samples at the laboratory including both time of collection and time of reception of each sample, as well as the temperature measured from the tester (see earlier paragraph). If the temperature exceeds 4°C ,

the samples will be discarded. Sample preparation (reagent addition, pouring into tray and sealing) will be initiated at most six hours after the sample is collected. To insure that the holding time criterion is met, the laboratory data manager will receive a copy of the field log format and will log in the samples at the laboratory including both time of collection and time of reception of each sample. If the time of reception exceeds six hours the sample will be discarded and a new sample will have to be collected at the respective location. Three different dilutions will be prepared of one sample (1:1, 1:10, and 1:100, or as determined after looking at historical data for each location) and three replicates will be prepared of each dilution. Sealed samples will be placed in an incubator at 35⁰C, the starting incubation time and temperature will be recorded in the lab logbook. Samples will be removed from the incubator after 24 hours of incubation. The time at which the samples are removed from the incubator will be recorded in the lab logbook. If the incubation time exceeds 24 hours, the sample will be discarded and a new sample will have to be collected. Counting will be initiated as soon as all the dilutions from one sample are removed from the incubator.

EC analysis in sediment

Pint glass jars with teflon liners will be used to collect sediment samples. Duplicate samples will be sealed and carried in ice chests from the point of collection to the University of Houston laboratory. The laboratory data manager will receive a copy of the field log format and will log in the samples at the laboratory including both time of collection and time of reception of each sample, as well as the temperature measured from the tester (see earlier paragraph). The indirect enumeration of microorganisms from a sediment sample will involve transferring the organisms from the sample into a water phase. Water sample preparation will be initiated at most six hours after the sample is collected. To insure that the holding time criterion is met, the laboratory data manager will receive a copy of the field log format and will log in the samples at the laboratory including both time of collection and time of reception of each sample. If the time of reception exceeds six hours the sample will be discarded and a new sample will have to be collected at the respective location. The sediment-to-water transference will start as soon as possible after the samples are logged in at the laboratory but in all cases in less than two hours and will follow the procedure outlined below:

1. Weigh 10 g of the sediment sample into a 250 mL Erlenmeyer flask. Label the flask with the corresponding sample ID.
2. Add 100 mL of sterile buffered dilution water (Std. Methods 9050C.1) to each flask.
3. Place flasks in an orbital shaker and mix on a medium setting for one hour.
4. Allow the samples to settle for 30 minutes and decant the liquid for analysis.
5. Prepare serial dilutions (10^{-2} , 10^{-3} , 10^{-4} , and 10^{-5}) using sterile buffered dilution water (Std. Methods 9050C.1).

Filtering will start as soon as possible after the water samples are prepared. Sample size will be dictated based upon experience. It is anticipated that the average EC number will be between 1,000 to 50,000 cfu/100 g. Three different dilutions will be filtered of one sample (1:10, 1:100, and 1:1000, or as determined after looking at historical data for each location), and three replicates will be prepared of each dilution. Once a sample is filtered, incubation will be started. Prior to loading the incubator, the temperature will be set to 30⁰C. The incubation temperature as well as the time at which incubation started will be recorded in the lab logbook. After two hours, the incubation temperature will be raised to

44.5⁰C, the time and temperature will be recorded in the lab logbook. Samples will be removed from the incubator after at least 22 hours of incubation and in any case prior to 26 hours of incubation. The time at which the samples are removed from the incubator will be recorded in the lab logbook. If the incubation time exceeds 26 hours, the sample will be discarded and a new sample will have to be collected. Counting will be initiated as soon as all the dilutions from one sample are removed from the incubator. Plates with too few (less than 20) or too many (more than 100) colonies will be discarded, but in any case they will be recorded in the lab logbook.

TSS and TOC

Pre-cleaned LDPE bottles and pre-cleaned borosilicate glass bottles will be used to collect samples for TSS and TOC analyses, respectively. Sulfuric acid will be added at the field to the TOC bottles until pH is less than or equal to 2. Duplicate samples will be sealed and carried in ice chests from the point of collection to the University of Houston laboratory/North Water District Laboratory Services. The laboratory data manager will receive a copy of the field log format and will log in the samples at the laboratory including both time of collection and time of reception of each sample, as well as the temperature measured from the tester (see earlier paragraph). pH measurements will be taken from the samples to be analyzed for TOC, and the value will be recorded in the logbook; if pH exceeds 2, the sample will be discarded. Both TSS and TOC samples will then be transferred to the cold room and the temperature of the thermostat will be recorded (should be less than or equal to 4⁰C). Samples collected during a one-week period (i.e. Monday through Friday) will be analyzed soon after the last sample is taken. To insure that the holding time criterion is met, a new record will be added to the lab log format to indicate the date and time at which analyses were initiated.

Carbonaceous BOD₅

Gallon cubitainers will be used to collect the samples for CBOD₅ tests. If residual chlorine is detected, 1 g/L of FAS crystals will be added to the samples. Duplicate samples will be sealed and carried in ice chests from the point of collection to the North Water District Laboratory. Sample crews will make every effort to deliver samples for analysis within 6 hours of collection. The laboratory data manager will receive a copy of the field log format and will log in the samples at the laboratory including both time of collection and time of reception of each sample, as well as the temperature measured from the tester (see earlier paragraph). To insure that the holding time criterion is met, a new record will be added to the lab log format to indicate the date and time at which sample preparation was initiated. Sample analysis will be initiated as soon as possible but in no case will it start after 24 hours of collection. A new record will be added to the lab log format to indicate the time at which sample preparation is initiated. If the overall holding time exceeds 24 hours, the sample will be discarded and re-collected. Samples will be left on ice until sample preparation is initiated.

Failures in Chain-of-Custody and Corrective Action

All failures associated with chain-of-custody procedures are immediately reported to the University of Houston Project Manager. These include such items as delays in transfer, resulting in holding time violations; violations of sample preservation requirements; incomplete documentation, including signatures; possible tampering of samples; broken or spilled samples, etc. The University of Houston Project Manager, in consultation with the PBS&J Project Manager will determine if the procedural

violation may have compromised the validity of the resulting data. Any failures that have reasonable potential to compromise data validity will invalidate data, and the sampling event should be repeated. The resolution of the situation will be reported to the TNRCC in the quarterly progress report. Corrective action reports will be maintained by University of Houston/PBS&J QAO.

B4 Analytical Methods Requirements

The analytical methods are listed in Table 1 of Section A7. The analyses cited in the table are approved in “Standard Methods for the Examination of Water and Wastewater.” Laboratory SOPs are consistent with method requirements. Copies of laboratory SOPs are retained by the University of Houston and are available for review by the TNRCC.

Standards Traceability

All standards used in the laboratory are traceable to certified reference materials. Standards preparation is fully documented and maintained in a standards logbook. Each documentation includes information concerning the standard identification, starting materials, including concentration, amount used and lot number, date prepared, expiration date and preparer’s initials or signature. The reagent bottle will be labeled in a way that will trace the reagent back to preparation.

Alternative Methodologies

Only data collected under TNRCC approved analytical methodologies as specified in this QAPP will be submitted to the TNRCC. Changes to the methodologies specified in this document (modifications of EPA approved methods, new methods, etc.) are changes to the QAPP, which is described in Section A6. Approval may involve equivalency testing, etc. Amended work will only begin after the TNRCC Project Manager and QAS have approved the modified procedures.

Failures or Deviations in Analytical Methods Requirements and Corrective Actions

Failures in analytical methods requirements involve, but are not limited to such things as instrument malfunctions, failures in calibration, blank contamination, quality control samples outside QAPP defined limits, etc. In many cases, the field technician or lab analyst will be able to correct the problem. If the problem is resolvable by the field technician or lab analyst, then they will document the problem on the field data sheet or laboratory record and complete the analysis. If the problem is not resolvable, then it is conveyed to the Laboratory Supervisor, who will make the determination and notify the University of Houston/PBS&J QAO. If the analytical system failure may compromise the sample results, the resulting data will not be reported to the TNRCC as part of this study. The nature and disposition of the problem is reported on the data report that is sent to the University of Houston Project Manager. The University of Houston Project Manager will include this information on the Quarterly Report, which is sent to the TNRCC Project Manager.

B5 Quality Control Requirements

Sampling Quality Control Requirements and Acceptability Criteria

The minimum Field QC Requirements are outlined in the *TNRCC Surface Water Quality Monitoring Procedures Manual* and Table 4 under Field Supervisor and staff tasks. The field staff should complete a documented review of 100% of the field data for compliance with QC requirements and the University of Houston/PBS&J will complete a documented review of a minimum of 10% of the field data. Specific requirements are outlined below. Field QC Samples are reported with the data report. See Section C2.

Bottle and Equipment Blanks (Filter/acid blanks) - An equipment blank is a sample of reagent water poured into a sample bottle, or poured over or pumped through a sampling or analysis device. It is collected in the same type of container as the environmental sample, preserved in the same manner and analyzed for the same parameter. In addition to regularly collected bottle and equipment blanks, laboratory equipment blanks are prepared at the laboratory where collection materials are cleaned between uses. These blanks document that the materials provided by the laboratory are free of contamination. The QC check is performed before each set of equipment is sent to the field, and before each new batch of samples to be analyzed in the laboratory. The analysis of equipment blanks should yield values less than the MAL. When target analyte concentrations are very high, blank values must be less than 5% of the lowest value of the batch.

Field duplicates - A field duplicate is defined as a second sample (or measurement) from the same location, collected in immediate succession, using identical techniques. This applies to all cases of routine surface water collection procedures, including in-stream grab samples, bucket grab samples (e.g., from bridges), pumps, and other water sampling devices. Duplicate samples are sealed, handled, stored, shipped, and analyzed in the same manner as the primary sample. Precision of field duplicate results is calculated by the relative percent difference (FRPD) as defined by 100 times the difference (range) of each duplicate set, divided by the average value (mean) of the set. For duplicate results, X_1 and X_2 , the FRPD is calculated from the following equation:

$$FRPD = \left\{ \frac{(X_1 - X_2)}{(X_1 + X_2)/2} \right\} * 100$$

For bacteria, the logarithms of the actual counts are used in this formula.

Field duplicates will be collected at a frequency of 10% or higher. The FRPD between field duplicates should be less than 20%. If the FRPD of the field duplicates exceeds 20%, the laboratory should communicate this to the sampling team so that the source of error can be identified and corrective measures taken before the next sampling event.

Field Blanks - Field blanks consist of analyte-free de-ionized water that is taken to the field and transferred to the appropriate container in precisely the same manner as a sample during the course of a sampling event. They are used to assess the contamination from field sources such as air borne materials, containers, and preservatives. The analysis of field blanks should yield values less than the

Minimum Analytical Level. When target analyte concentrations are high, blank values should be less than 5% of the lowest value of the batch. Field blanks will be collected at a frequency of 10% or greater.

Laboratory Measurement Quality Control Requirements and Acceptability Criteria

Detailed laboratory QC requirements are contained within each individual method and Laboratory Quality Assurance Manuals. The minimum requirements that all participants abide by are stated in Table 4 under Laboratory Supervisor and Staff and below. Lab QC sample results are reported with the data report (see Section C2).

Laboratory duplicate - Laboratory duplicates are used to assess precision. A laboratory duplicate is prepared by splitting aliquots of a single sample (or a matrix spike or a laboratory control standard) in the laboratory. Both samples are carried through the entire preparation and analytical process. Laboratory duplicates are analyzed on 10% of samples analyzed. Acceptability criteria are outlined in Table 1 of Section A7.

Precision is calculated by the relative percent difference (LRPD) of lab duplicate results as defined by 100 times the difference (range) of each duplicate set, divided by the average value (mean) of the set. For duplicate results, X_1 and X_2 , the LRPD is calculated from the following equation:

$$\text{LRPD} = \{ (X_1 - X_2) / [(X_1 + X_2) / 2] \} * 100$$

For bacteria, the logarithms of the actual counts are used in this formula.

Laboratory Control Standard (LCS) - A laboratory control sample is analyte-free water spiked with the analyte of interest prepared from standardized reference material. The laboratory control standard is generally spiked into laboratory pure water at a level less than or equal to the mid-point of the calibration curve for each analyte. The LCS is carried through the complete preparation and analytical process. The LCS is used to document the accuracy of the method due to the analytical process. LCSs are generally run at a rate of one per batch. Acceptability criteria are laboratory specific and usually based on results of past laboratory data. LCSs are routinely incorporated into the analysis program. The analysis of LCSs is a measure of accuracy and is calculated by Percent Recovery %R is defined as 100 times the observed concentration, divided by the true concentration of the spike.

The formula used to calculate percent recovery, where %R is percent recovery; SR is the observed spiked sample concentration; SA is the spike added:

$$\%R = (SR/SA) * 100$$

Matrix spikes (MS) and matrix spike duplicates- A matrix spike is an aliquot of sample spiked with a known concentration of the analyte of interest. A matrix spike duplicate (MSD) is a second matrix spike prepared in exactly the same manner. Percent recovery of the known concentration of added

analyte is used to assess accuracy of the analytical process. The spiking occurs prior to sample preparation and analysis. Matrix spike samples and matrix spike duplicates are routinely prepared and analyzed at a rate of 10% of samples processed. The MS is spiked at a level less than or equal to the midpoint of the calibration or analysis range for each analyte. The MS is used to document the accuracy of a method due to sample matrix and not to control the analytical process. Acceptability criteria are outlined in Table 1 of Section A7 and is calculated by Percent Recovery. Percent Recovery (%R) is defined as 100 times the observed concentration, minus the sample concentration, divided by the true concentration of the spike. Acceptance criteria are defined in Table 1 of Section A7.

The formula used to calculate percent recovery, where %R is percent recovery; SSR is the observed spiked sample concentration; SR is the sample concentration; and, SA is the spike added; is:

$$\%R = \{(SSR - SR) / SA\} * 100$$

Method Blank- A method blank is an analyte-free matrix to which all reagents are added in the same volumes or proportions as used in the sample processing and analyzed with each batch. The method blank is carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination from the analytical process. Method blanks will be run before the start of fecal analysis, and following each sample. For the other analyses (TOC and TSS), deionized water will be run through the machines every five samples. The analysis of method blanks should yield values less than the Minimum Analytical Level. For very high level analyses, blank value should be less than 5% of the lowest value of the batch.

Additional method specific QC requirements - Additional QC samples are run (e.g., surrogates, internal standards, continuing calibration samples, interference check samples) as specified in the methods. The requirements for these samples, their acceptance criteria, and corrective action are method-specific.

Failures in Quality Control and Corrective Action

Sampling QC excursions are evaluated by the University of Houston/PBS&J Project Managers, in consultation with the University of Houston/PBS&J QAO. In that differences in field duplicate sample results are used to assess the entire sampling process, including environmental variability, the arbitrary rejection of results based on pre-determined limits (e.g. FRPD > 20%) is not practical. Therefore, the professional judgement of the University of Houston/PBS&J Project Managers and QAO will be relied upon in evaluating results. Rejecting sample results based on wide variability is a possibility. Notations of field duplicate excursions and blank contamination are noted in the quarterly report and the final QC Report.

Corrective action will involve identification of the cause of the failure where possible. Response actions will typically include re-analysis of questionable samples. In some cases, a site may have to be re-sampled to achieve project goals.

Laboratory measurement quality control failures are evaluated by the laboratory staff. The disposition

of such failures and conveyance to the TNRCC are discussed in Section B4 under Failures or Deviations in Analytical Methods Requirements and Corrective Actions.

B6 Instrument/Equipment Testing, Inspection and Maintenance Requirements

All sampling equipment testing and maintenance requirements are detailed in the *TNRCC Surface Water Quality Monitoring Procedures Manual*. Equipment records are kept on all field equipment and a supply of critical spare parts is maintained by the University of Houston/PBS&J Field Supervisor, or designee.

All laboratory tools, gauges, instrument, and equipment testing and maintenance requirements are contained within laboratory QAM(s). Testing and maintenance records are maintained and are available for inspection by the TNRCC. Instruments requiring daily or in-use testing may include, but are not limited to, water baths, ovens, autoclaves, incubators, refrigerators, and laboratory pure water. Critical spare parts for essential equipment are maintained to prevent downtime. Maintenance records are available for inspection by the TNRCC. The University of Houston Project Manager assumes responsibility for compliance of the QAM Quality Assurance Management Plan from the laboratory with the QAPP requirements.

B7 Instrument Calibration and Frequency

Field Equipment calibration requirements are contained in the *TNRCC Surface Water Quality Monitoring Procedures Manual*. Post calibration error limits and the disposition resulting from error are adhered to. Data not meeting post-error limit requirements invalidates associated data collected subsequent to the pre-calibration and are not submitted to the TNRCC.

Detailed laboratory calibrations are contained within the QAM(s). The laboratory QAM identifies all tools, gauges, instruments, and other sampling, measuring, and test equipment used for data collection activities affecting quality that must be controlled and, at specified periods, calibrated to maintain bias within specified limits. Calibration records are maintained and are available for inspection by the TNRCC. Equipment requiring periodic calibrations include, but are not limited to, thermometers, pH meters, balances, incubators, turbidity meters, and analytical instruments. Calibration records are available to the TNRCC for review. The University of Houston Project Manager and the Laboratory Managers assume responsibility for compliance of the QAM Quality Assurance Management Plan from the laboratory with the QAPP requirements.

B8 Inspection/Acceptance Requirement for Supplies and Consumables

Each new batch of supplies are tested before use to verify that they function properly and are not contaminated. The laboratory QAM provides additional details on acceptance requirements for laboratory supplies and consumables.

B9 Data Acquisition Requirements

Appendix B of this QAPP includes sampling by the U. S. Geological Survey (USGS). Flow data will be acquired from USGS gages on Buffalo and Whiteoak Bayous during the period of study (Source Codes GS/GS). These data are not covered under this QAPP and will not be reported to the TNRCC Data Manager by the University of Houston/PBS&J. However, data collected by the above organization that meet the data quality objectives of this project may be useful in satisfying the data and informational needs of the TMDL, and are included in Appendix B for that reason.

In addition, rainfall data will be obtained from the Harris County Flood Control District (HCFCD) monitoring network for the period July 2001 to December 2001 and from the City of Houston Public Works and Engineering (SC1/SC2: HG/HP) for the same time period. These data will be used for calibrating a fate and transport model of fecal pathogens in the Buffalo and Whiteoak Bayous and will not be reported to the TNRCC Data Manager.

Data Validation

Data management is an important part of QA for data collection activities. Part of the measurement objective for this plan is to use the collected data (ambient and non-ambient) to calibrate a suitable model to quantify the fate and transport of the indicator bacteria and to determine the maximum permissible loading to Buffalo and Whiteoak Bayous that will meet contact recreation criteria. All acquired data will be reviewed and verified for integrity and continuity, reasonableness, and conformance to project requirements (sampling procedures, analytical methods, representativeness, and accuracy) and then validated against the DQOs. The validation process shall include verification of the sampling design and execution (location, dates, time, procedures, etc), sample handling procedures (preservation, holding times, chain-of-custody, etc), laboratory procedures (sample identification, analytical methods, equipment maintenance, etc.), and analytical results (project and quality control samples). The results of the validation process shall be compared with the applicable requirements in the QAPP to determine if the data can be used. The validation, comparison, and final determination must be documented and the documentation must be maintained with other project record and available for audit or inspection. Only those data that are ambient measurements, which are supported by appropriate QC data and meet the DQOs defined for this project will be considered acceptable, and will be reported for entry into the Surface Water Quality Monitoring (SWQM) portion of the Texas Regulatory and Compliance System (TRACS) database.

B10 Data Management

Data Management Protocols are addressed in the Data Management Plan, which is in Appendix E of the document.

References

TNRCC, 1999a. *Data Management Reference Guide, Surface Water Quality Monitoring* (or most current version).

TNRCC, 1999b. *Surface Water Quality Monitoring Procedures Manual, GI-252*, June 1999.

TNRCC, 1999c. *Receiving Water Assessment Procedures Manual, GI-253*, June 1999.

Note: when references are made to documents that are not attached to the QAPP, the Project Manager of the University of Houston assumes responsibility for compliance of the documentation with the QAPP requirements.

C1 Assessments and Response Actions

The following table presents the types of assessments and response action for data collection activities applicable to the QAPP.

Table 3. Assessments and Response Actions

Assessment Activity	Approximate Schedule	Responsible Party	Scope	Response Requirements
Status Monitoring Oversight, etc.	Continuous	University of Houston Project Manager	Monitoring of the project status and records to ensure requirements are being fulfilled. Monitoring and review of contract laboratory performance and data quality	Report to TNRCC in Quarterly Report. Ensure project requirements are being fulfilled.
Laboratory Inspections	Dates to be determined by the TNRCC lab inspector	TNRCC Laboratory Inspector	Analytical and quality control procedures employed at the laboratory and the contract laboratory	30 days to respond in writing to the TNRCC to address corrective actions
	Annually	University of Houston/PBS&J QAO		Implements corrective action. Report sent to TNRCC QAS
Monitoring Systems Audit	Dates to be determined by TNRCC	TNRCC QAS	The assessment will be tailored in accordance with objectives needed to assure compliance with the QAPP.	30 days to respond in writing to the TNRCC to address corrective actions
	Annually	University of Houston/PBS&J QAO	Field sampling, handling and measurement; facility review; and data management as they relate to the TMDL Project	Report sent to TNRCC QAS. Resolves any deficiencies.
Performance Evaluation Samples	Annually	University of Houston/PBS&J QAO	Checks competency of the laboratory and the contract laboratory to perform analyses	Report sent to TNRCC QAS. Resolves any deficiencies. Verifies satisfactory performance with second set of PES

Corrective Action

The University of Houston Project Manager is responsible for implementing and tracking corrective action procedures as a result of audit findings. Records of audit findings and corrective actions are maintained by both the TNRCC TMDL Program and the University of Houston/PBS&J Quality Assurance Officer.

If audit findings and corrective actions cannot be resolved, then the authority and responsibility for terminating work is specified in the TNRCC QMP and in agreements or contracts between participating organizations.

C2 Reports to Management

Laboratory Data Reports

Laboratory data reports contain the results of all specified QC measures listed in section B5, including but not limited to equipment blanks, filter and reagent blanks, field blanks, laboratory duplicates, laboratory control standards, calibrations, and matrix spikes. This information is reviewed by the University of Houston/PBS&J QAO and compared to the pre-specified acceptance criteria to determine acceptability of data before forwarding to the University of Houston Project Manager. This information is available for inspection by the TNRCC.

Reports to TNRCC Project Management

All reports detailed in this section are contract deliverables and are transferred to the TNRCC in accordance with contract requirements.

Quarterly Progress Report - Summarizes the University of Houston/PBS&J's activities for each task; reports problems, delays, and corrective actions; and outlines the status of each task's deliverables.

Monitoring Systems Review Checklist and Report of Significant Corrective Actions - Following the annual audits performed by the University of Houston/PBS&J, the monitoring systems audit checklist along with recommendations and corrective actions is sent to the TNRCC.

Reports by TNRCC Project Management

Contractor Evaluation - The University of Houston participates in a Contractor Evaluation by the TNRCC annually for compliance with administrative and programmatic standards.

D1 Data Review, Validation, and Verification Requirements

For the purposes of this document, verification means the processes taken to confirm by examination and provision of objective evidence that specified QAPP/project requirements, including documentation and technical criteria, have been fulfilled. Validation means those processes taken independently of the data-generation processes to confirm by examination and provision of objective evidence of the quality control acceptability of all the processes involved in the production of environmental data. Integrity means the processes taken to assure that no falsified data will be reported.

All data obtained from field and laboratory measurements will be reviewed and verified for conformance to project requirements, and then validated against the data quality objectives which are listed in Section A7. Only those data which are supported by appropriate quality control data and meet the data quality objectives defined for this project will be considered acceptable, and will be reported to the TNRCC for entry into TNRCC's water quality database. All other data will be rejected.

The procedures for verification and validation of data are described in Section D2, below. The University of Houston/PBS&J Field Supervisors are responsible for ensuring that field data are properly reviewed and verified for integrity. The Laboratory Supervisor is responsible for ensuring that laboratory data are scientifically valid, defensible, of acceptable precision and accuracy, and reviewed for integrity. The University of Houston Data Manager will be responsible for ensuring that all data are properly reviewed and verified, and submitted in the required format to the project database. The University of Houston/PBS&J QAO is responsible for documented validation of a minimum of 10% data for each task. Finally, the University of Houston Project Manager, with the concurrence of the PBS&J Project Manager, is responsible for validating that all data to be reported meet the objectives of the project and are suitable for reporting to TNRCC.

D2 Verification and Validation Methods

All data will be verified to ensure they are representative of the samples analyzed and locations where measurements were made, and that the data and associated quality control data conform to project specifications. The staff and management of the respective field, laboratory, and data management tasks are responsible for the integrity, validation and verification of the data each task generates or handles throughout each process. The field and laboratory tasks ensure the verification of raw data, electronically generated data, and data on chain-of-custody forms and hard copy output from instruments.

Verification, validation and integrity review of data will be performed using self-assessments and peer review, as appropriate to the project task, followed by technical review by the manager of the task. The data to be verified (listed by task in Table 4) are evaluated against project specifications (Section A7) and are checked for errors, especially errors in transcription, calculations, and data input. Potential outliers are identified by examination for unreasonable data, or identified using computer-based statistical software. If a question arises or an error or potential outlier is identified, the manager of the task responsible for generating the data is contacted to resolve the issue. Issues which can be corrected are corrected and documented electronically or by initialing and dating the associated paperwork. If an

issue cannot be corrected, the task manager consults with higher level project management to establish the appropriate course of action, or the data associated with the issue are rejected.

The University of Houston Project Manager and the University of Houston/PBS&J QAO are each responsible for validating that the verified data are scientifically valid, defensible, of known precision, accuracy, integrity, meet the data quality objectives of the project, and are reportable to TNRCC. One element of the validation process involves evaluating the data again for anomalies. The University of Houston/PBS&J QAO or Project Manager may designate other experienced water quality experts familiar with the water bodies under investigation to perform this evaluation. Any suspected errors or anomalous data must be addressed by the manager of the task associated with the data, before data validation can be completed.

A second element of the validation process is consideration of any findings identified during the annual monitoring systems audit conducted by the TNRCC QAS assigned to the project. Any issues requiring corrective action must be addressed, and the potential impact of these issues on previously collected data will be assessed. Finally, the University of Houston Project Manager, with the concurrence of the University of Houston/PBS&J QAO, validates that the data meet the data quality objectives of the project and are suitable for reporting to TNRCC.

D3 Reconciliation with User Requirements

No decisions will be made by the project team based on the data collected. These data, and data collected by other organizations (e.g., USGS, TNRCC, etc.), will be subsequently analyzed and used by the TNRCC for TMDL development, stream standards modifications, permit decisions, and water quality assessments.

Table 4 Data Review, Verification, and Validation Procedures

Data to be Verified	Field Supervisor and Staff	Laboratory Supervisor and Staff	Data Manager	UH Project Manager/ QAO Task *
Collection and analysis techniques consistent with SOPs and QAPP	√	√	√	√
Field QC samples collected for all analytes as prescribed in the TNRCC SWQM Procedures Manual	√			√
Field documentation(e.g. biological, stream habitat) complete	√			√
Instrument calibration data complete	√	√		√
Bacteriological records complete	√	√		√
Sample documentation complete	√	√	√	√
Field QC results within acceptance limits	√			√
Field QC results attached to DB check list			√	√
Sample identifications	√	√	√	√
Chain of custody complete/acceptable	√	√	√	√
Sample preservation and handling	√	√F, L	√	
Holding times	√	√F, L	√	√
Instrument calibration data	√	√	√F	√
QC samples analyzed at required frequencies	√	√	√F	√
QC samples within acceptance limits	√	√	√	√
Internal/external standards	√	√	√	√
Instrument readings/printouts	√	√	√	√
Calculations	√	√	√	√
MALs for lab analyses		√	√	√
Laboratory data verification for integrity, precision, accuracy and validation		√		√

Data to be Verified	Field Supervisor and Staff	Laboratory Supervisor and Staff	Data Manager	UH Project Manager/QAO Task *
Laboratory data reports		√	√	√
Data entered in required format	√	√	√	√
TNRCC ID number assigned			√	√
Valid STORET codes	√	√	√	√
Absence of transcription error	√	√	√	√
Source codes 1, 2, and 3 used correctly			√	√
Reasonableness of data	√	√	√	√
Electronic submittal errors	√	√	√	√
Sampling and analytical data gaps	√	√	√	√
Database Check List			√	√

*University of Houston/PBS&J Project Manager/QAO will monitor only 10% of data for QA/QC purpose

All other entities are required to inspect 100% of the data prior to approval

F = Field (Only field related)

L = Laboratory

Appendix A. Monitoring Plan

MONITORING DATA FOR SOURCE IDENTIFICATION AND QUANTIFICATION

Introduction

Segments 1013 and 1014 of Buffalo Bayou and Segment 1017 of Whiteoak Bayou in Houston, Texas are among the most fecal contaminated water bodies in Texas as indicated by the frequency and magnitude of exceedances of FC-based water quality criteria for contact recreation (see Tables 5a through 5c). The overall project will result in the completion of a Total Maximum Daily Load (TMDL), which will be submitted to TNRCC for approval by the Commission. In addition, the project will also provide several allocation scenarios which the TNRCC will use in the development of an implementation plan in support of the TMDL.

As part of the TMDL project the University of Houston and PBS&J will collect field data on concentrations and dynamics of fecal pathogens in the segments of concern to assess sources, current contamination levels and trends. This QAPP addresses those monitoring activities.

Project Description

The Buffalo and Whiteoak Bayou systems have been and continue to be monitored for a range of conventional water quality parameters. Data from four different sources (USGS, TNRCC, City of Houston PW&E and City of Houston H&HS) were acquired as part of the tasks outlined in the first work order of the bacteria TMDL project (University of Houston and PBS&J, 2000a,b). The monitoring data have been analyzed and indicate that the bayous maintain relatively high concentrations of indicator bacteria even under dry weather conditions when essentially all of the flow is composed of treated and disinfected wastewater. The expectation for disinfected wastewater would be low bacteria levels.

The main reasons for monitoring under the bacteria TMDL project are to understand and document the sources of these elevated bacteria levels so that development of appropriate control measures that can be implemented to bring bacteria levels into compliance with the contact recreation criteria. A second reason is to better understand the processes affecting bacteria concentrations in the bayous, such as survival in the water and sediment, possible regrowth/reactivation, and inputs from the sediments. A third reason for monitoring is to obtain better data to calibrate a water quality model of the system. The monitoring program covered by this QAPP includes four major components:

- Monitoring of point sources under dry-weather conditions,
- Searches for illicit discharges in both sewered and unsewered areas,
- Sampling of moderate runoff in main stream for model calibration, and
- Analyses of concentration dynamics in the bayous.

Table 5a. Impairments of Designated Uses to be Addressed in this TMDL ProjectBasin: *San Jacinto River Basin*

Segment ID:

1013

Segment Name: *Buffalo Bayou Tidal*Impaired Uses: *Contact Recreation, Aquatic Life*

Year of Most Recent 305(b) Assessment: 1998

Assessment Period: 1993-1997	Station ID	Exceedances of the Criterion by Month per Total Number of Samples by Month During the 5-year Assessment Period												All months	Average	Suspected Source from 305(b)
Assessment Method		J	F	M	A	M	J	J	A	S	O	N	D			
FC > 400	11345	0/0	3/3	0/0	0/0	3/3	0/0	0/0	4/4	0/0	0/0	2/2	0/0	12/12	35155 cfu/dl	Urban NPS
FC > 400	11351	0/0	1/1	0/0	0/0	1/1	0/0	0/0	1/1	0/0	0/0	0/0	0/0	3/3	59330 cfu/dl	Urban NPS

Table 5b. Impairments of Designated Uses to be Addressed in this TMDL ProjectBasin: *San Jacinto River Basin*

Segment ID:

1014

Segment Name: *Buffalo Bayou Above Tidal*Impaired Uses: *Contact Recreation, Aquatic Life*

Year of Most Recent 305(b) Assessment: 1998

Assessment Period: 1993-1997	Station ID	Exceedances of the Criterion by Month per Total Number of Samples by Month During the 5-year Assessment Period												All months	Average	Suspected Source from 305(b)
Assessment Method		J	F	M	A	M	J	J	A	S	O	N	D			
FC > 400	11358	0/0	1/1	0/0	0/0	2/2	0/0	0/0	1/1	0/0	0/0	0/0	0/0	4/4	17090 cfu/dl	Municipal PS Urban NPS
FC > 400	11362	0/0	2/3	0/0	0/0	3/4	0/0	0/0	4/4	0/0	0/0	1/1	0/0	10/12	17855 cfu/dl	Municipal PS Urban NPS

Table 5c. Impairments of Designated Uses to be Addressed in this TMDL ProjectBasin: *San Jacinto River Basin*

Segment ID:

1017

Segment Name: *Whiteoak Bayou Above Tidal*Impaired Uses: *Contact Recreation, Aquatic Life*

Year of Most Recent 305(b) Assessment: 1998

Assessment Period: 1993-1997	Station ID	Exceedances of the Criterion by Month per Total Number of Samples by Month During the 5-year Assessment Period												All months	Average	Suspected Source from 305(b)
Assessment Method		J	F	M	A	M	J	J	A	S	O	N	D			
FC > 400	11387	0/0	2/2	0/0	0/0	3/3	0/0	0/0	3/3	0/0	0/0	1/1	0/0	9/9	19465 cfu/dl	Municipal PS Urban NPS
FC > 400	11388	0/0	1/1	0/0	0/0	1/1	0/0	0/0	1/1	0/0	0/0	0/0	0/0	3/3	56330 cfu/dl	Municipal PS Urban NPS
FC > 400	11398	0/0	1/3	0/0	0/0	3/4	0/0	0/0	3/3	0/0	0/0	0/1	0/0	7/11	7400 cfu/dl	Municipal PS Urban NPS

Point Source Monitoring

In dry weather essentially all of the flow in these urban bayous is from point source discharges. Therefore, our search for understanding of water bacteria levels will start with these water sources. These discharges are required to maintain a chlorine residual of 1 mg/L for at least 20 minutes and plants larger than 1 MGD are required to dechlorinate down to a concentration of <0.01 mg/L. These requirements must be met in wet weather conditions when the plants are at maximum permitted flows (these requirements must be met at all times, although they are most difficult to meet during wet weather events). In practice, the chlorine contact time is much longer in dry weather and low flows. If all of these requirements were met, in theory there should be very low levels of indicator bacteria in the effluents. Since the effluents essentially are the bayou flows in dry weather, low bacteria levels should be the norm. However, sampling done as part of a recent Greens Bayou Intensive Survey (City of Houston Public Works and Engineering Department, 1999) showed discharged FC concentrations higher than 200 cfu/dL, with 2 of 12 samples exhibiting FC counts near 10,000 cfu/dL. Similarly, data from inspections conducted by HCPC between 1998 and 2000 showed that 25 out of 29 measurements (for a total of 18 small plants in the Buffalo and Whiteoak Bayous) exceeded the limit of 200 cfu/dL, with 14 samples showing FC levels higher than 10,000 cfu/dL.

One of the problems with smaller plants may be poor control over the chlorination process. While the City of Houston (COH) plants in these stream segments have a sophisticated system to regulate the dosage of disinfectant and the sodium bisulfite dechlorination agent, that is not true for many of the smaller facilities. That lack of automatic control, plus the fact that these plants are checked infrequently, may mean that high levels of indicator bacteria are not at all uncommon. In Whiteoak and Buffalo, there are 76 and 44 domestic WWTP with flows lower than 1 MGD, respectively releasing close to 38 and 12% of the median flow in these bayous (45 and 90 cfs, respectively).

To investigate and document this situation a program of point source monitoring that will include early morning and mid-morning sampling of a broad range of plants over the course of a 6-month period is proposed. This sampling effort will cover all the minor domestic wastewater treatment plants (flow less than 1 MGD) discharging to Buffalo and Whiteoak Bayous. A total of 120 wastewater dischargers will be sampled (see Appendix B for sampling location and scheduling).

A sampling crew (2 people) will leave early in the morning to sample two small plants by 0800, and then will deliver the samples to the lab. This round of samples will characterize the discharge at the low point in the diurnal flow cycle. Samples will be collected at a point following the chlorine contact chamber as it is flowing over the weir. The sampling will include doing a field measurement of residual chlorine, estimating the flow, estimating conventional chemical parameters (see Table 1) and collecting water samples for laboratory analyses. Each of the samples will be analyzed for FC and EC along with TSS at the University of Houston laboratory. The methods that will be employed by the University of Houston lab are:

FC	M9222D	Membrane filtration
EC	IDEXX	IDEXX MPN Quantitray 2000
Total Suspended Solids	E160.2	Filtration, dry weight

The EC analyses will be performed using the IDEXX Colilert method that is a separate test from the FC analysis, which may result in EC counts higher than the FC data.

To sample the high flow period, the crew will repeat the trip in mid-morning, getting the samples to the lab by early afternoon. This process will continue during dry weather until all the plants had been sampled and those plants that showed high bacteria values had been resampled (the highest 20).

Illicit Discharges

This component will include sampling of stormsewers discharging into the bayous under dry-weather conditions to identify illicit discharges to the bayous via stormsewers that may come from a sanitary sewer problem of some type or outright unpermitted wastewater discharges. This work will include review of monitoring in the bayous to identify locations where a sudden increase in indicator bacteria occurs, and checking on stormsewers to find flow. In dry weather the stormsewers should be dry so flow could be an illicit discharge.

In general terms, this effort will be undertaken by two-person teams that will work in dry weather only. They will be equipped with maps of the stormsewer system and the locations of the outfalls. Prior to sampling the teams will walk along the bayous and main tributaries to perform reconnaissance of the stormsewer infrastructure. During this reconnaissance effort, the teams will identify how many outfalls are discharging into the bayous and confirm their presence in the GIMS database so that their properties can be determined (diameter, length, material, and age). If an outfall is not found in the GIMS maps, it will be noted with its diameter and material. Geographic locations will be verified using Global Positioning System (GPS) to the extent possible and practical. GPS activities will be conducted using a Motorola LGT 1000 equipped with Starlink MRB-2A radio beacon receiver to correct for selective availability. This equipment has a real time correction providing accuracy of 5 meters.

Once all the outfalls have been located and identified, the sampling activities will start. The sampling points will be based on locatable outfalls discharging under dry-weather conditions. A maximum of 60 points will be sampled for this component. For sampling in the Buffalo Bayou, a canoe will be used to both expand the sampling area and insure detailed coverage. It is expected that in a seven-day period, the area from Eldridge Parkway Bridge to Shepherd Street Bridge could be covered and with a canoe to transport sampling equipment and personnel, 98% of all the outfalls could be located and sampled. Further, for sampling of the remaining segments of Buffalo Bayou as well as sampling of Whiteoak Bayous and the tributaries to both bayous, the crews will walk pilot areas determined after field reconnaissance. The criteria to select those areas include diameter of the stormsewers (sampling will focus mainly on large diameter lines since they represent large drainage areas and this should offer the most coverage for potential dry weather flow) and age of the lines. Appendix B contains a map of the preliminary pilot areas.

The sampling crew will first determine if there is flow, and then determine if there is a residual chlorine level indicating a drinking water leak of some type. If it is chlorinated water, no further work will be done other than the flow estimate. If the flow is significant it should be reported as a water leak. If the water is not chlorinated, two different criteria will be applied to determine whether samples will be collected for

bacterial and TSS analyses. First, the presence of ammonia using a field test kit will be assumed as an indicator of fecal contamination and, therefore, samples will be collected. Second, the observation of *Sphaerotilus* will be considered a trigger for sample collection. *Sphaerotilus* is a non-fungus aerobic bacteria that prefers habitats with slowly running fresh water contaminated with sewage and grows attached to submerged plants, rods, and other solid objects. *Sphaerotilus* will appear submerged in the flow and attached to a hard surface. The color of the growth is a gray to white hue (see Standard Methods for additional information). The sampling crew will also measure the approximate dimensions of the flow and estimate the velocity. The samples will be iced and the team will move to the next stormsewer outfall. By 1400 the team will head to the University of Houston lab arriving in time for the bacteria samples to begin filtration.

Based on available data, two preliminary pilot areas have been identified (See Appendix B); however, these sampling areas may change as the field recognition is conducted. Appendix B includes the sampling schedule for the illicit discharges monitoring.

Runoff Event Monitoring

Concentrations of indicator bacteria in runoff tend to be very large, several orders of magnitude greater than the criteria developed for swimming areas in fair weather. For safety as well as bacteria reasons, the main project emphasis needs to be on lower flow conditions. However, there is also a need to consider some runoff events simply because they are often small enough to have a very small effect on flow in the main stem of the bayous, and thus become part of the “background” levels. Accordingly, this monitoring program will include at least three smaller rain events in each watershed.

Runoff event monitoring will be conducted at the USGS locations on each bayou (e.g. Whiteoak Bayou at Heights and Buffalo at West Belt or Piney Point) so that flow data will be available for acquisition (see Section B9 for data validation). USGS Station 08074200 (Whiteoak at Alabonson) appears to be defective because its record shows a consistent base flow of about 400 cfs; therefore, this station is discarded for runoff sampling. Nor will Buffalo at McKee (08074610) and Whiteoak at Main (08074598) be sampled as they are stage record gages and flow is not monitored. The sampling crews will deploy to the USGS gages and collect samples with pre-sterilized buckets from the bridges. Two non-USGS stations on Whiteoak Bayou and one on Buffalo Bayou will also be sampled and flow will be measured. Samples will be analyzed for conventional parameters in the field and for FC and EC by North Water District Laboratory Services. In parallel, we will obtain rainfall data from the HCFCD network as well as the City stations.

Events will be limited to those that could be sampled during daylight hours. Samples will be collected as soon as possible on the rising limb of the hydrograph, and then at roughly 3-hr intervals till dark. To track the expected decline in bacteria levels on the falling limb, samples will be collected the next morning and then at 12-hr intervals for the next two days. See Appendix B for the location of the monitoring sites.

Concentration Dynamics in the Bayous

Once a disinfected discharge enters the bayous it becomes subject to a very different set of environmental conditions. After chlorine has been eliminated by contact with organic matter and sediments, it may be possible for indicator bacteria to either reactivate (assuming they were stunned but

not killed by the disinfectant) or regrow (assuming some cells survived and there was sufficient nutrients to support growth of the cells that also perform well on the FC or EC tests). Either mechanism, or some other mechanism not well defined, can result in higher stream levels than are typically seen in wastewater effluents.

To study these regrowth or resupply dynamics, we propose a series of field and laboratory experiments where we seek to isolate various mechanisms and document changes and rates. There will be three main elements: in-stream dynamics (normal rates of change), rates of change influenced by freshwater (regrowth), and rates of change affected by resupply from stream sediments.

The in-stream dynamics tests will comprise a series of *in-situ* chambers placed in Buffalo and Whiteoak bayous. The chambers will be attached to round floats so the edge of the chamber is above the water surface, but the water inside the chamber will be exposed to the air and true ambient conditions. The floats will be tethered or anchored so that they could be easily sampled. To avoid contamination from bird droppings, the floats will be fitted with a clear plastic “umbrella”. It is recognized that if a significant flow increase occurs, the containers will be lost. Duplicate EC subsamples will be collected from each chamber the first morning and evening after installation of the chambers and the morning and evening following installation. In addition, routine probe parameters will be monitored from the collected samples. Each set of chambers will have a control, either in the ambient water (water collected from the stream approximately tracking the water initially sampled as it moved downstream under the influence of sediment and intervening sources) or a chamber without additions. A DI water blank will be prepared for each batch of bags. Chamber conditions will be varied to further examine the exact dynamics occurring at the bayous. Some of the variations in chamber conditions are as follows: post-rain versus dry conditions, effluent mixes versus natural site water to assess regrowth, and effluent or site water mixed with channel sediments to obtain an indication of the effect of solids content on rates. Tracking the bagged and water samples will provide an indication of the growth and dieoff rates as influenced by day-night light intensity, sediment levels, organic strength and isolation from the sediment. Appendix B includes a map with the proposed locations for this component. We expect this testing process to evolve with model calibration and development, with model needs guiding the testing decisions. Data obtained from the dynamics studies will not be considered ambient monitoring and will not be submitted to the TNRCC database.

For the regrowth studies, bayou water samples will be collected under dry weather conditions from upstream, effluent and from the mixing zone downstream from four large domestic wastewater treatment plants (preliminary locations are mapped on Appendix B). The samples will be collected in new plastic garbage sacks (presumed to be free of significant bacterial contamination). All samples will be checked in the field for residual chlorine. Dechlorination will be performed if necessary. An aliquot of each water sample will be analyzed for N and P forms, TOC, CBOD₅, and TSS by North Water District Laboratory Services. Duplicate subsamples will be collected at the start and tested for bacterial levels. The collected effluent and upstream water will be mixed together to simulate the downstream mixing zone. This would yield two sets of bottles, with one set from the downstream mixing zone and one simulating the same conditions. The samples will be taken back to the laboratory where conditions such as sunlight and temperature could be controlled and gentle mixing will be provided with a small flow of air. Subsamples will then be withdrawn after a one to two day period and analyzed for EC levels with

IDEXX. If significant increases in bacteria concentrations are noted, regrowth of shocked cells may be occurring. If the mixing zone concentrations increases, and no bacteria are detected in the effluent, this might suggest that nutrients in the effluent were stimulating growth in bacteria from upstream.

Resupply of bacteria from sediments will be assessed by collecting sediment grab samples at locations removed from point sources and mixing a predetermined amount (1 mL, 10 mL, and 100 mL) of sediment unconsolidated surface mud with 1L of previously collected and autoclaved stream water. Three aliquots will be made from each water-sediment mixture. A control using DI water will be used as well. The water-sediment mixtures will be shaken and then an initial portion of each sample will be poured off for EC analysis. The bottles will be maintained near bayou water temperatures in low light conditions and resampled after the first and second days for EC and routine probe parameters. It is expected that differences in the initial level of bacteria concentrations will be proportional to the initial sediment addition. Further increases in bacteria concentrations following incubation would be evidence of bacteria resupply. The results of the experiment should not be affected by low dissolved oxygen occurring after 1-2 days. Additional tests will be conducted by allowing the top of the bottles to be open to ensure DO similar to bayou levels, and EC analysis will be conducted again.

Standard statistical tests for means and variance using Excel spreadsheets will be used to analyze the data to identify significant trends in data obtained from the dynamics tests.

Finally, to determine baseline sediment concentrations, EC levels will be measured in up to 20 sediment samples. Analyses of sediment samples will be conducted only if the results from the dynamics test show that resuspension is a significant source of EC into the Buffalo and Whiteoak Bayous. Preliminary locations for sediment sampling are included in Appendix B. This locations, however, may change depending on model segmentation and needs. In addition to EC analysis, sediment samples will be analyzed to obtain particle size data.

Data Analysis

The product of the sampling exercise will be a quantification of FC, EC, and TSS as well as conventional field parameters. We will then be able to analyze data to assess potential sources of contamination as well as the weather- and time-based trends, and possible correlations between bacterial counts and other chemical parameters, and to set-up and calibrate a fate and transport model of fecal pathogens in the Buffalo and Whiteoak Bayous.

Data Submittal

The following data will be submitted to be entered into the TRACS database:

Table 6. Data to be included into TRACS

		Project Component
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		I.1	I.2	II	III	IV.1	IV.2	IV.3	IV.4
Field Parameters									
pH	pH units	N	N	N	Y	N	N	N	N/A
DO	mg/L	N	N	N	Y	N	N	N	N/A
Conductivity	mS/cm	N	N	N	Y	N	N	N	N/A
Temperature	° Celcius	N	N	N	Y	N	N	N	N/A
Flow	cfs	N	N	N	Y	N	N	N	N/A
Flow Severity	1 -no flow, 2-low, 3-normal, 4-flood, 5-high, 6-dry	N	N	N	Y	N	N	N	N/A
Conventional Parameters									
TSS	mg/L	N	N	N	Y	N/A	N	N/A	N/A
TOC	mg/L	N/A	N/A	N/A	N/A	N/A	N	N/A	N/A
Residual chlorine	mg/L	N	N	N	N/A	N/A	N	N/A	N/A
Ammonia-N	mg/L	N	N	N	N/A	N/A	N/A	N/A	N/A
<i>o</i> -Phosphorous	mg/L	N	N	N	N	N	N	N	N/A
Turbidity	NTU	N	N	N	Y	N	N	N	N/A
CBOD ₅	mg/L	N/A	N/A	N/A	N/A	N/A	N	N/A	N/A
FC in water	cfu/100 mL	N	N	N	Y	N/A	N/A	N/A	N/A
EC in water	MPN/100 mL	N	N	N	Y	N	N	N	N/A
EC in sediment ³	cfu/100 g	N/A	N/A	N/A	N/A	N/A	N/A	N	Y
Sediment grain size analysis	% dry weight 0.0039-0.0625 mm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y
Sediment grain size analysis	% dry weight < 0.0039 mm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y
Sediment grain size analysis	% dry weight 0.0625- 2 mm	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y

N = No; Y = Yes; N/A = not applicable (parameter will not be measured)

Appendix E outlines the requirements for data submittal to the TRACS database.

Schedule

Testing will begin in July 2001. Sampling and testing will continue for 9 months. A report describing the testing procedures and results will be prepared two months after testing is finished or as specified in the approved work order. Figure 2 depicts the proposed timeline for the work done under this QAPP.

References

City of Houston Public Works and Engineering Department. (1999). "Greens Bayou Intensive Survey and Wasteload Evaluation Final Report." Prepared for the Texas Clean Rivers Program, Houston-Galveston Area Council, Houston, TX.

University of Houston and PBS&J. (2000a). "Total Maximum Daily Load for Fecal Pathogens in Buffalo Bayou and Whiteoak Bayou - Quarterly Report No. 1." Prepared for the Texas Natural Conservation Commission, Houston, TX.

University of Houston and PBS&J. (2000b). "Total Maximum Daily Load for Fecal Pathogens in Buffalo Bayou and Whiteoak Bayou - Quarterly Report No. 2." Prepared for the Texas Natural Conservation Commission, Houston, TX.

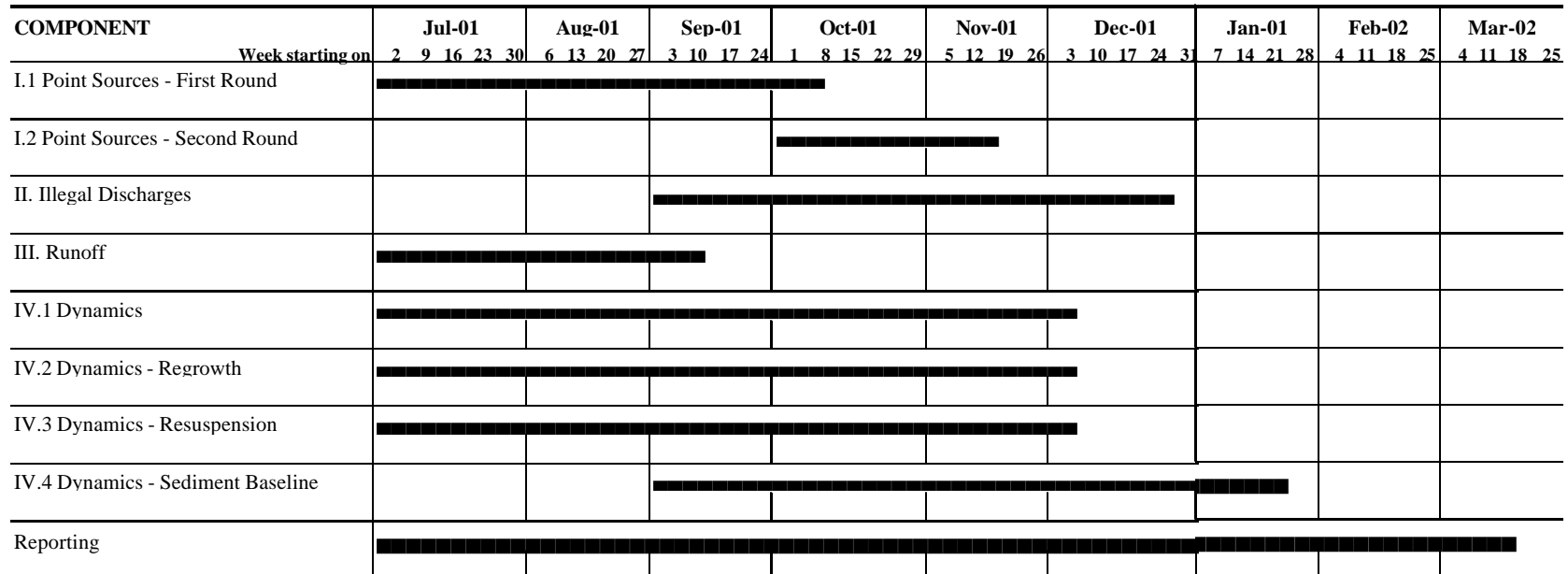


Figure 2. Monitoring Plan Timeline

Appendix B. Sampling Process Design and Monitoring Schedule

Sample Design Rationale

The sample design is based on the program requirements of the Total Maximum Daily Load Program. The TNRCC, and the University of Houston/PBS&J through contract with the TNRCC, has been tasked with providing data and information to characterize water quality conditions, to identify the presence or absence of impairments of designated water body uses, and to support water quality modeling, site-specific water quality standard revisions, the load allocation, and other TMDL data and information needs. As part of the TMDL stakeholder involvement process, the University of Houston coordinates closely with the TNRCC and other TMDL participants to ensure an adequate water monitoring strategy to supply informational needs for modeling, assessment, load allocation, and decision-making.

Site Selection Criteria

This data collection effort involves monitoring point and non-point source data for the purpose of aiding TMDL development. This study will collect ambient and non-ambient data, a small portion of which will be entered to the statewide surface water quality database. The criteria employed for selecting sites included: presence on the 303(d) list, probability of elevated FC and EC concentrations, proximity to USGS stations (runoff samples), representativeness of particular land uses in a watershed, accessibility and safety. All monitoring activities will be developed in coordination with the TNRCC.

Monitoring Sites

A list of the stations to be sampled under this QAPP is included in Table 7, and Figures 3 to 7 show the locations of the sampling sites.

Critical vs. non-critical measurements

FC and EC results are critical to the success of the TMDL project.

Monitoring Schedule **Buffalo Bayou and White Oak Bayou TMDL Project**
Segment ID: 1013, 1014 and 1017

Sampling Component ^a	Segment	Site description	Permit number/ Station ID	Sample ID	Scheduled Date	Completed Date	SCI/ SC2	Prog Code	Monitoring frequencies (per monitoring program)										CBOD ₅	Grain size
									Flow	FC	EC	TSS	TOC	Wet chemistry ^b	Residual chlorine	Ammonia				
I.1	1017	HARRIS CO FWSD 061	10876-002	S2	07/24	07/24	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	HARRIS CO MUD 170	12121-001	S4	07/24	07/24	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	HARRIS CO FWSD 061	10876-001	S1	07/24	07/24	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	TIFCO INDUSTRIES	12465-001	S3	07/25		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	NORTHW HARRIS CO MUD 029	12795-001	S5	07/26	07/26	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	HARRIS CO MUD 006	11273-001	S6	07/26	07/26	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	WEST HARRIS CO MUD 010	14072-001	S7	07/27		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	SUPERIOR DERRICK SERV	12443-001	S8	07/27	07/27	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	SMITH, WILLIAM - William Smith Mobile Home F	12573-001	S15	07/27	07/27	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	WHITE OAK BEND MUD	11979-002	S9	07/30	07/30	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	REID ROAD MUD 001	11563-001	S10	07/30	07/30	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	WEST HARRIS CO MUD 21 WWTF	13623-001	S12	07/31	07/31	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	RIEDEL, ANTHONY	13939-001	S13	08/01		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	HERON LAKE ESTATES WWTF	13433-001	S11	08/01	08/01	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	ABB VETCO GRAY INC	11651-001	S14	08/01		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	CREEKSIDE UTILITIES	11375-001	S26	08/01	08/01	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	HANOVER LAND CO.	11797-001	S16	08/02		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	CB&I CONSTRUCTORS, INC.	11389-001	S19	08/02	08/02	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	KONECRANES LANDEL	13912-001	S20	08/02	08/02	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1014	OCEANEERING INTL. INC.	12466-001	S39	08/03	08/03	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1014	WEATHERFORD SPENCER RD WWTF	14070-001	S41	08/03	08/03	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	CHAMP'S WATER CO.	11005-001	S17	08/06		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	HARRIS CO MUD #119	12714-001	S18	08/06		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1014	WYMAN-GORDON FORGINGS	01402-002	S51	08/07	08/07	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1014	WEST HARRIS CO MUD #15	12223-001	S52	08/07	08/07	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	SMITH, BOB	13509-001	S22	08/08		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1014	HARRIS CO MUD 250	12685-001	S65	08/08	08/08	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1014	HARRIS CO MUD 155	12726-001	S60	08/08	08/08	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	C&P UTILITIES	12342-001	S21	08/08		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	MOORPARK VILLAGE	13727-001	S24	08/09		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	HARRIS CO METRO UD	13673-001	S23	08/09		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1014	CHIMNEY HILL MUD	12304-001	S62	08/09	08/09	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1014	HARRIS CO MUD 102	11523-001	S72	08/10	08/10	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1014	HORSEPEN BAYOU MUD	12128-001	S70	08/10	08/10	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	ROLLING FORK PUD	11188-001	S25	08/13		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1014	HARRIS CO MUD 167	12834-001	S56	08/13	08/13	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1014	MAYDE CREEK MUD	11969-001	S83	08/13	08/13	tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	HARRIS CO MUD 130	12574-001	S33	08/14		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	HARRIS CO MUD 023	11485-001	S27	08/14		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	SUNBELT FWSD	11670-001	S28	08/14		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1014	NORTHWEST HARRIS CO MUD 16	11935-001	S77	08/14		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	RESTAURANT SERVICE	13983-001	S30	08/15		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1014	FRY ROAD MUD	11989-001	S84	08/15		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1014	WEST HARRIS CO MUD 017	12247-001	S82	08/15		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	MCDONALDS CORP.	13807-001	S29	08/15		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	WEST HARRIS CO MUD 011	13689-001	S32	08/16		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	VANCOUVER MANAGEMENT	11051-001	S31	08/16		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	HARRIS CO MUD 247	12681-001	S34	08/20		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	NCI BUILDING SYSTEMS	12552-001	S35	08/21		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	NCI BUILDING SYSTEMS	12552-002	S36	08/21		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1014	ADDICKS UD	11696-002	S89	08/22		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	COOPER CAMERON CORP.	13578-001	S38	08/22		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1014	WEST PARK MUD	12346-001	S88	08/22		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1014	ADAMOLI, JAMES	12811-001	S37	08/22		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1014	ROBINSON, J. WAYNE	12830-001	S40	08/23		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	AQUASOURCE UTILITY	11193-001	S42	08/27		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	HOUSTON-WESTWAY UD	10495-139	S44	08/28		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	AQUASOURCE UTILITY	12222-001	S43	08/28		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	TRAMMELL CROW	13996-001	S46	08/29		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1017	FAIRBANKS PLAZA SHOPPING	12139-001	S45	08/29		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					
I.1	1014	HARRIS CO MUD 157	11906-001	S47	08/30		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c					

Monitoring Schedule **Buffalo Bayou and White Oak Bayou TMDL Project**
Segment ID: 1013, 1014 and 1017

Sampling Component*	Segment	Site description	Permit number/ Station ID	Sample ID	Scheduled Date	Completed Date	SCI/ SC2	Prog Code	Monitoring frequencies (per monitoring program)								CBOD ₅	Grain size
									Flow	FC	EC	TSS	TOC	Wet chemistry ^b	Residual chlorine	Ammonia		
I.1	1014	HARRIS CO-JUVENILE BOOT CAMP	13921-001	S48	08/30		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	HARRIS CO MUD 196	12447-001	S49	09/03		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	REMINGTON MUD 001	13328-001	S50	09/03		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	NORTHW HARRIS CO MUD 012	11991-001	S54	09/05		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	HARRIS CO MUD 105	11792-002	S53	09/05		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	HARRIS CO MUD 127	12209-001	S55	09/06		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	HARRIS CO MUD 284	12949-001	S58	09/10		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	ROLLING CREEK UD	12841-001	S57	09/10		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	HARRIS CO MUD #149	11836-001	S59	09/11		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	SPENCER ROAD PUD	11472-001	S61	09/12		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	SASSON, ELI	11414-001	S63	09/13		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	VERRY, RICHARD	12310-001	S64	09/13		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	PETERSEN, JAMES	12398-001	S66	09/17		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	529 #35, LTD	13484-001	S67	09/18		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	VARCO SHAFFER	03994-001	S68	09/18		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	AIR LIQUIDE AMERICA	13959-001	S69	09/19		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	TOSHIBA INTERNATIONAL	03153-002	S71	09/20		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	HARRIS CO MUD 185	12124-001	S73	09/24		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	HARRIS CO MUD 276	12927-001	S74	09/24		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	FRIEDMAN, STEPHEN	13778-001	S75	09/25		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	LANGHAM CREEK UD	11682-001	S76	09/25		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	HARRIS CO MUD 166,257,276	12474-001	S78	09/26		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	WEST HARRIS CO MUD 007	12140-001	S80	09/27		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	HARRIS CO MUD 071	11917-001	S79	09/27		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	TEX-SUN PARKS	12189-001	S81	10/01		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	HARRIS CO MUD 238	12802-001	S86	10/03		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	KATY ISD	12110-001	S85	10/03		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	WESTLAKE MUD 001	11284-001	S87	10/04		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	WEST HOUSTON AIRPORT	12516-001	S90	10/08		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	WESTON MUD	12412-001	S92	10/09		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	WILLIAMSBURG REGIONAL	11598-001	S91	10/09		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	TRANSWESTERN KATY FREEWAY	11632-001	S94	10/10		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	HARRIS COUNTY-BEAR CK	11883-001	S93	10/10		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	CASTLEWOOD MUD	12356-001	S95	10/11		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	HARRIS CO. MUD #345	12682-001	S96	10/11		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	HOUSTON-PARK TEN	10495-135	S97	10/12		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	HARRIS CO MUD 216	12406-001	S98	10/12		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	GREEN TRAILS MUD	10932-001	S99	10/15		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	NOTTINGHAM COUNTRY MUD	12427-001	S100	10/15		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	NOTTINGHAM COUNTRY MUD (WTP)	12233-001	S102	10/16		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	HARRIS COUNTY-CULLEN	12355-001	S101	10/16		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	ASEP AMERICA, INC.	12132-001	S103	10/17		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	AIVAZIAN, GEORGE	13764-001	S104	10/17		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	BAYOU CLUB OF HOUSTON	12289-001	S105	10/18		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1017	TOWER MANAGEMENT SERV	12479-001	S106	10/18		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1017	WHITE OAK OWNERS ASSOC.	12370-001	S107	10/22		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	FORT BEND CO MUD 034	12498-001	S108	10/22		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	COOPER CAMERON CORP	12805-001	S110	10/23		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	FORT BEND CO MUD 037	13775-001	S109	10/23		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	HARRIS-FT BEND CO MUD	12298-001	S112	10/24		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	HARRIS-FORT BEND COS MUD	13228-001	S111	10/24		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	CINCO MUD 001	12858-001	S114	10/25		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	BIG OAKS MUD	13674-001	S113	10/25		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	FT BEND CO MUD 050	13245-001	S116	10/29		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	RLG REALTY HOLDINGS	13021-001	S115	10/29		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	GRAND LAKES MUD #4	13172-002	S117	10/30		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	CINCO MUD 001	13558-001	S118	10/30		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	GINTER REAL ESTATE	13218-001	S120	10/31		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.1	1014	HOUSTON AREA DEVELOPMENT	14011-001	S119	10/31		tbd/UH	DL	2 ^c	2 ^c	2 ^c	2 ^c		2 ^c	2 ^c			
I.2		20 POINT SOURCES (HIGHEST LEVELS)	tbd		11/01	12/08	tbd/UH	DL	2	2	2	2		2	2			
II	1017	PILOT AREA 1 - WHITEOAK	30 locations tbd	11 to 130	09/03	02/01	tbd/UH	DL	1 dry	1 dry	1 dry	1 dry		1 dry	1 dry	1 dry		

Monitoring Schedule **Buffalo Bayou and White Oak Bayou TMDL Project**
Segment ID: 1013, 1014 and 1017

Sampling Component ^a	Segment	Site description	Permit number/ Station ID	Sample ID	Scheduled Date	Completed Date	SCI/ SC2	Prog Code	Monitoring frequencies (per monitoring program)										Grain size
									Flow	FC	EC	TSS	TOC	Wet chemistry ^b	Residual chlorine	Ammonia	CBOD ₅		
II	1014	PILOT AREA 2 - BUFFALO	30 locations tbd	I31 to I60	09/03	02/01	tbd/UH	DL	1 dry	1 dry	1 dry	1 dry		1 dry	1 dry	1 dry			
III	1017	W. TIDWELL AVE.	15831	R7	07/02	08/31	tbd/PB	DL	10 wet	10 wet	10 wet	10 wet		10 wet					
III	1014	SHEPHERD DR.	11351	R4	07/02	08/31	tbd/PB	DL	10 wet	10 wet	10 wet	10 wet		10 wet					
III	1017	HEIGHTS BLVD.	11387	R5	07/02	08/31	tbd/PB	DL		10 wet	10 wet	10 wet		10 wet					
III	1017	HEIGHTS BLVD.	11387	R5	07/02	08/31	GS/GS	DL	10 wet			10 wet		10 wet					
III	1014	PINEY POINT RD	11358	R3	07/02	08/31	tbd/PB	DL		10 wet	10 wet	10 wet		10 wet					
III	1014	PINEY POINT RD	11358	R3	07/02	08/31	GS/GS	DL	10 wet										
III	1014	WEST BELT	11360	R2	07/02	08/31	GS/GS	DL	10 wet										
III	1014	DAIRY ASHFORD RD.	11362	R1	07/02	08/31	tbd/PB	DL	10 wet	10 wet	10 wet	10 wet		10 wet					
III	1017	JONES RD.	11398	R6	07/02	08/31	tbd/PB	DL	10 wet	10 wet	10 wet	10 wet		10 wet					
III	1014	WEST BELT	11360	R2	07/02	08/31	tbd/PB	DL		10 wet	10 wet	10 wet		10 wet					
IV.1	1017	JONES RD.	11398	D3	08/06	12/21	tbd/PB	DL			5 dry			5 dry					
IV.1	1014	WEST BELT	11360	D2	08/06	12/21	tbd/PB	DL			5 dry			5 dry					
IV.1	1014	SAN FELIPE ST.	11357	D1	08/06	12/21	tbd/PB	DL			5 dry			5 dry					
IV.1	1017	WATONGA	15830	D4	08/06	12/21	tbd/PB	DL			5 dry			5 dry					
IV.2	1014	HOUSTON-WEST DISTRICT WWTP	10495-030	RG4	08/06	12/21	tbd/PB	DL	3 dry		3 dry	1 dry	1 dry		3 dry		1 dry		
IV.2	1017	HARRIS COUNTY MUD 170	12121-001	RG1	08/06	12/21	tbd/PB	DL	3 dry		3 dry	1 dry	1 dry		3 dry		1 dry		
IV.2	1014	HOUSTON-NORTHWEST WWTP	10495-076	RG2	08/06	12/21	tbd/PB	DL	3 dry		3 dry	1 dry	1 dry		3 dry		1 dry		
IV.2	1017	MEMORIAL VILLAGES WA	10584-001	RG3	08/06	12/21	tbd/PB	DL	3 dry		3 dry	1 dry	1 dry		3 dry		1 dry		
IV.3	1014	WEST BELT	11360	RS2	08/06	12/21	tbd/PB	DL			1 dry ^d			1 dry					
IV.3	1017	JONES RD.	11398	RS3	08/06	12/21	tbd/PB	DL			1 dry ^d			1 dry					
IV.3	1017	WATONGA	15830	RS4	08/06	12/21	tbd/PB	DL			1 dry ^d			1 dry					
IV.3	1014	SAN FELIPE ST.	11357	RS1	08/06	12/21	tbd/PB	DL			1 dry ^d			1 dry				1 dry	
IV.4	1017	JONES RD.	11398	SE12	09/03	12/21	tbd/UH	DL			1 dry							1 dry	
IV.4	1014	WEST BELT	11360	SE5	09/03	12/21	tbd/UH	DL			1 dry							1 dry	
IV.4	1014	ELDRIDGE RD.	11363	SE2	09/03	12/21	tbd/UH	DL			1 dry							1 dry	
IV.4	1017	W. T C JESTER AVE.	15828	SE15	09/03	12/21	tbd/UH	DL			1 dry							1 dry	
IV.4	1017	WATONGA	15830	SE13	09/03	12/21	tbd/UH	DL			1 dry							1 dry	
IV.4	1014	BRIAR FOREST AVE.	15846	SE6	09/03	12/21	tbd/UH	DL			1 dry							1 dry	
IV.4	1017	HEIGHTS BLVD.	11387	SE17	09/03	12/21	tbd/UH	DL			1 dry							1 dry	
IV.4	1014	DAIRY ASHFORD RD.	11362	SE3	09/03	12/21	tbd/UH	DL			1 dry							1 dry	
IV.4	1014	SAN FELIPE ST.	11357	SE8	09/03	12/21	tbd/UH	DL			1 dry							1 dry	
IV.4	1014	WILCREST DR.	11361	SE4	09/03	12/21	tbd/UH	DL			1 dry							1 dry	
IV.4	1017	W. 43RD ST.	15829	SE16	09/03	12/21	tbd/UH	DL			1 dry							1 dry	
IV.4	1014	VOSS RD.	11356	SE10	09/03	12/21	tbd/UH	DL			1 dry							1 dry	
IV.4	1014	SHEPHERD DR.	11351	SE9	09/03	12/21	tbd/UH	DL			1 dry							1 dry	
IV.4	1014	PINEY POINT RD.	11358	SE7	09/03	12/21	tbd/UH	DL			1 dry							1 dry	
IV.4	1017	ELLA BLVD.	11391	SE14	09/03	12/21	tbd/UH	DL			1 dry							1 dry	
IV.4	1014	BARKER DAM	11142	SE1	09/03	12/21	tbd/UH	DL			1 dry							1 dry	
IV.4	1017	W.TIDWELL AVE.	15831	SE18	09/03	12/21	tbd/UH	DL			1 dry							1 dry	
IV.4	1014	SAN JACINTO AVE.	15842	SE11	09/03	12/21	tbd/UH	DL			1 dry							1 dry	
IV.4	tbd	tbd		SE20	09/03	12/21	tbd/UH	DL			1 dry							1 dry	
IV.4	tbd	tbd		SE19	09/03	12/21	tbd/UH	DL			1 dry							1 dry	

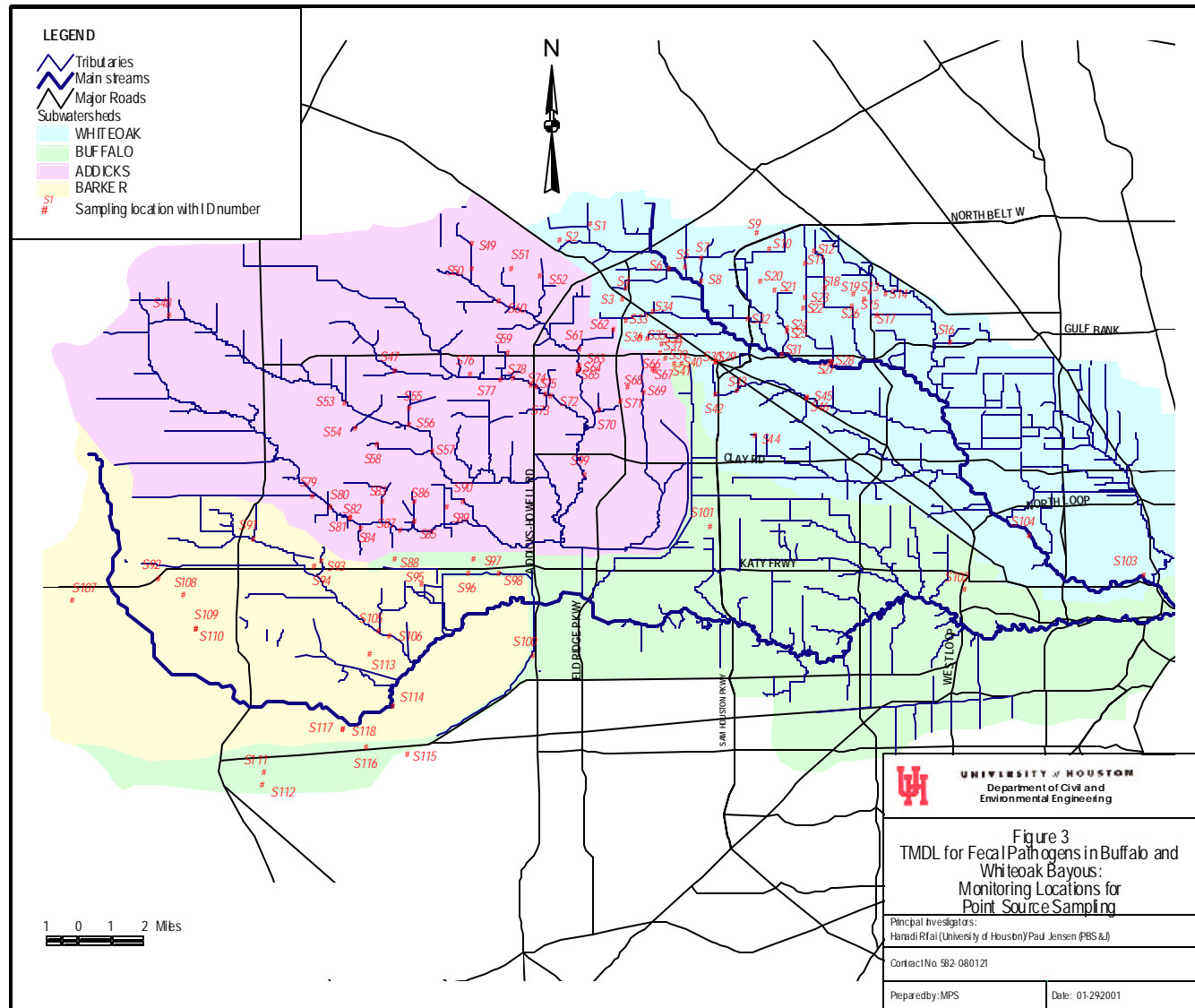
^a Monitoring components: I-Point Sources (1. First round, 2. Second round), II-Ilegal Discharges, III-Runoff, IV-Dynamics (1. In-stream Dynamics, 2. Growth, 3. Resuspension, 4. Sediment baseline concentration)

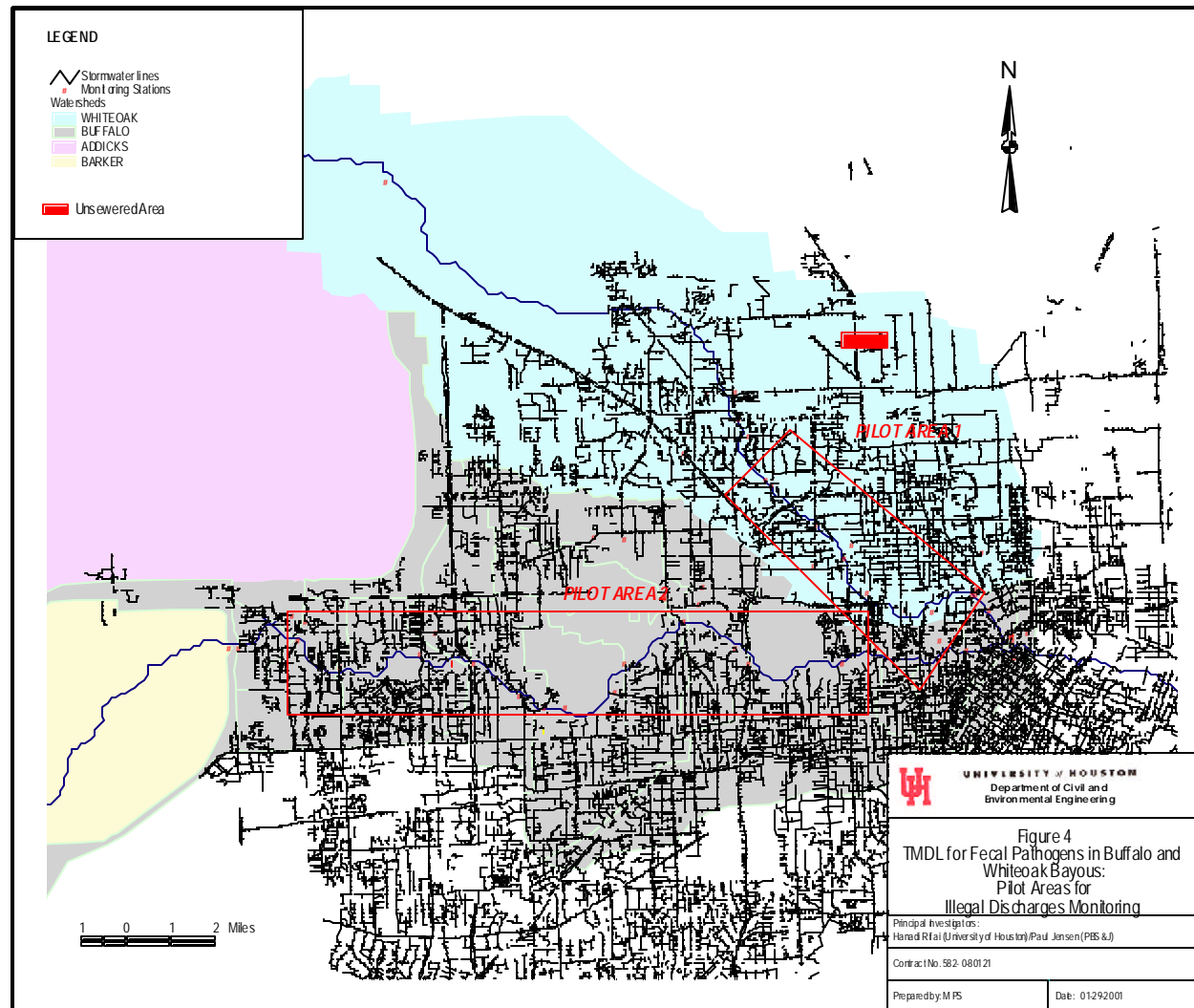
^b Wet chemistry analyses include DO, pH, turbidity, conductivity, and PO4--P

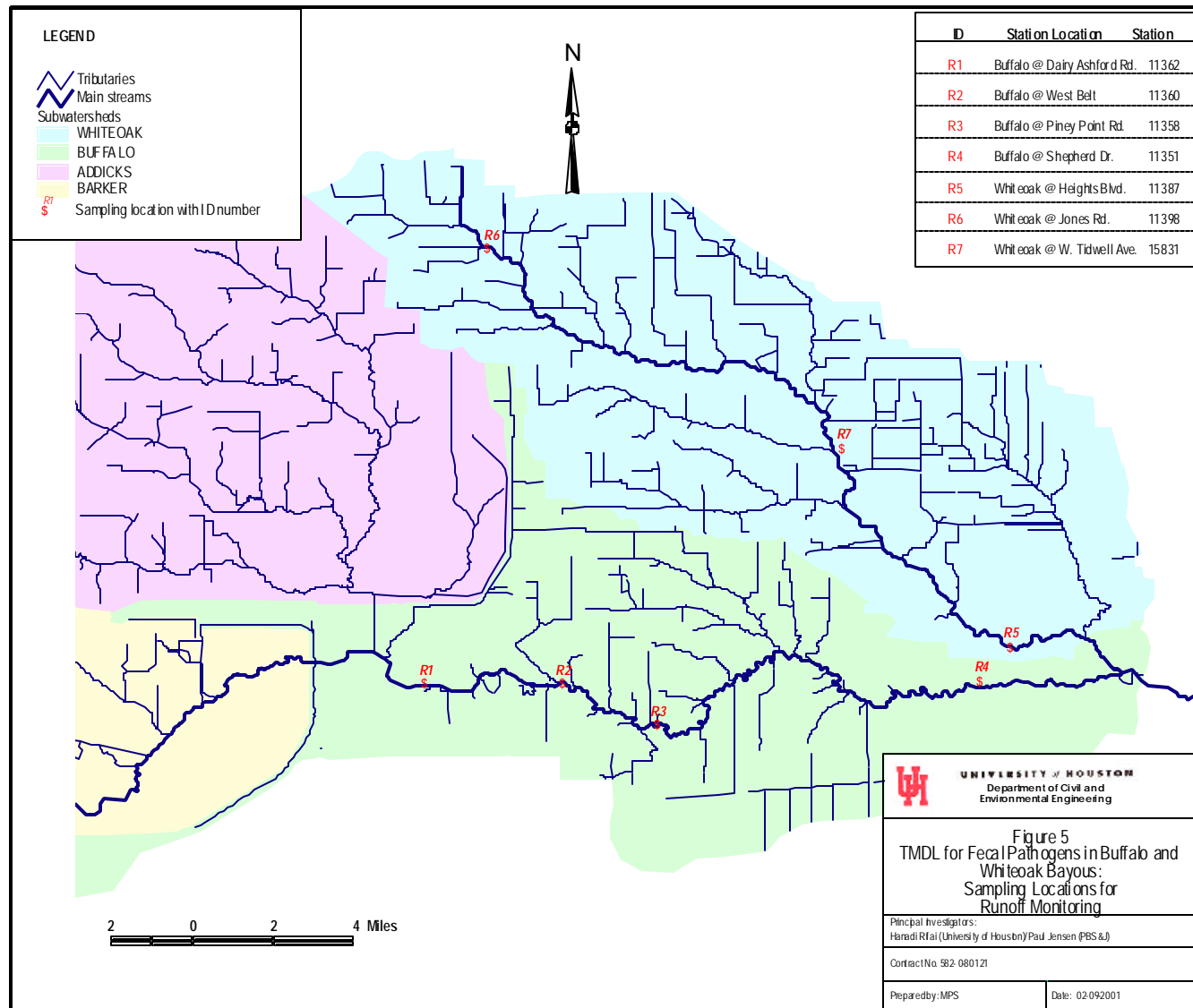
^c Two samples taken during the same day (one in the morning and the other at midday) for the first sampling round. If levels are high, then it may be monitored a second time

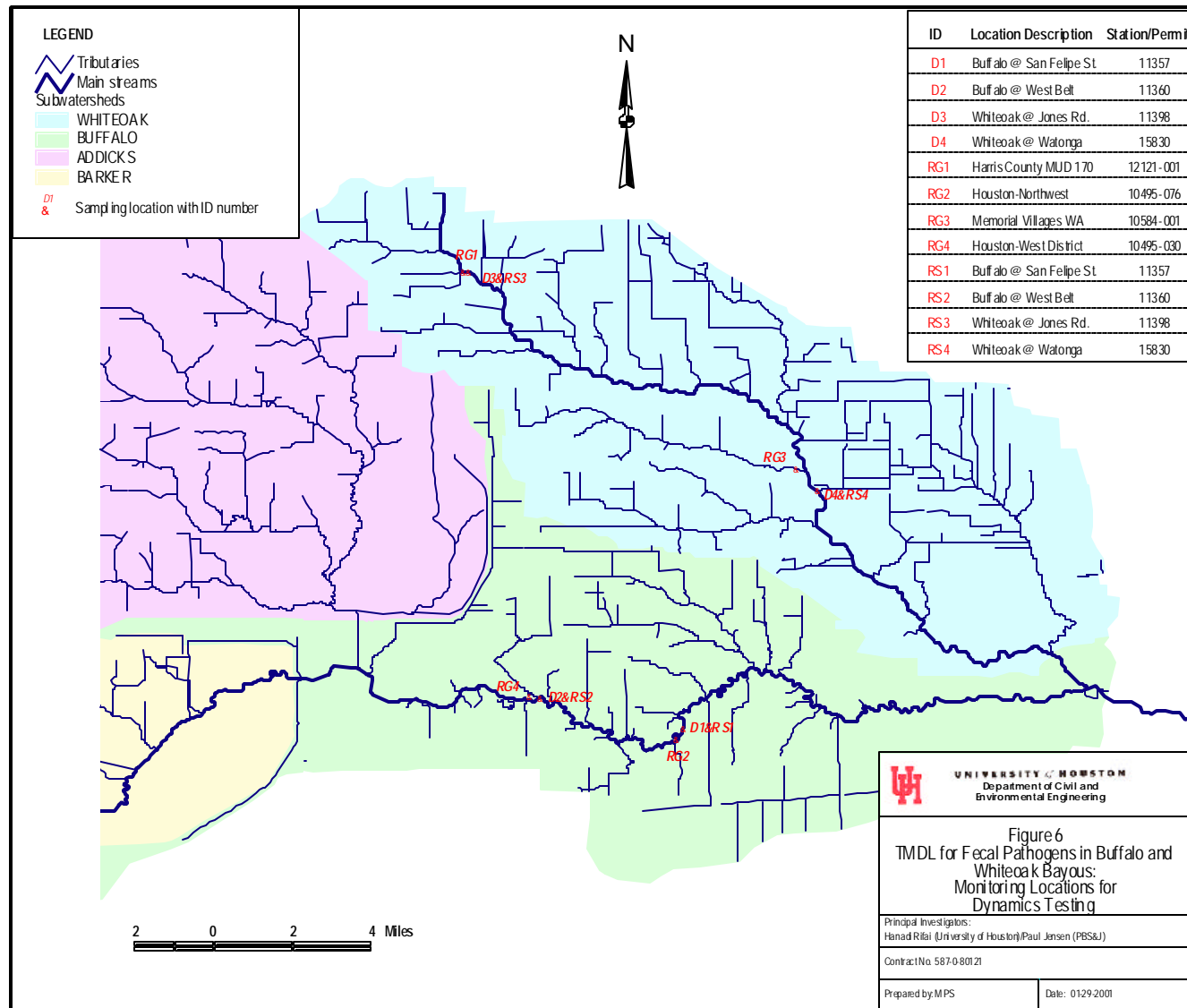
^d Sediment sample

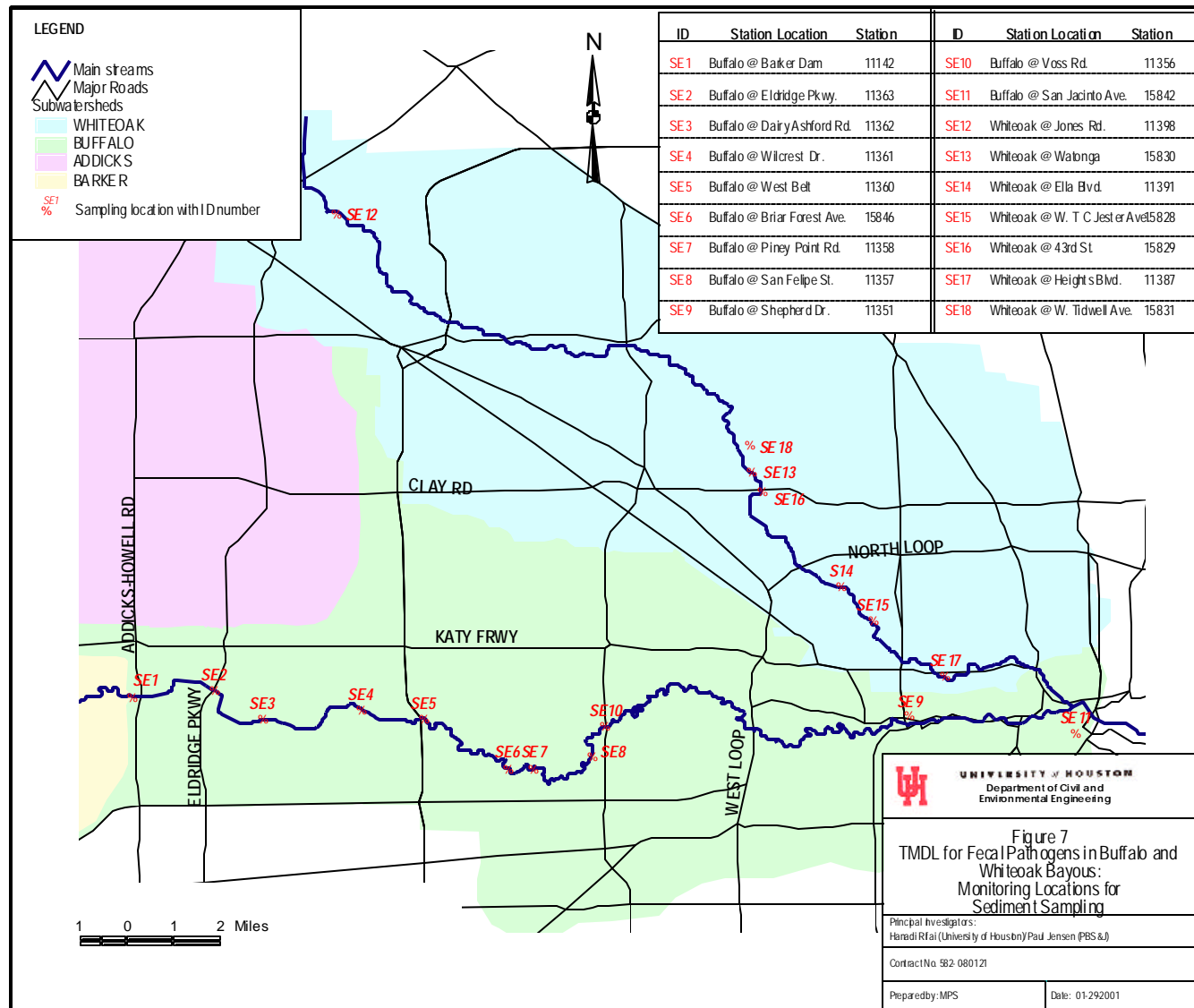
tbd = to be determined











Appendix C. Field Data Reporting Form

FIELD DATA SHEETS
FECAL PATHOGENS STUDY

Project Name/Location												
Job Number												
Sampler(s)												
<i>(signature)</i>												
Date	Time	Station ID/ Sample ID	Location	DO	pH	Temp.	Flow	Flow Severity¹	Residual chlorine	NH₃-N	PO₄-P	Observations²

¹ 1-no flow, 2-low, 3-normal, 4-flood, 5-high, 6-dry² Water appearance, weather, biological activity, stream uses, unusual odors, specific sample information, missing parameters, days since last significant rainfall, and flow severity if applicable.

Appendix D. Chain-of-Custody Form

University of Houston
 4800 Calhoun Road, Room N107D
 Houston, Texas 77204-4003

(713)743-4271

CHAIN OF CUSTODY RECORD

Project Name:					# of containers	Analyses Required					Sample ID
Station ID	Date	Time (24hr)	Matrix	Description		FC	EC	TOC	TSS	CBOD ₅	
Collected by: (signature)			Date:	Time:	Received by: (signature)	Date:	Time:	Laboratory remarks:			
Relinquished by: (signature)			Date:	Time:	Received by: (signature)	Date:	Time:				
Relinquished by: (signature)			Date:	Time:	Received by: (signature)	Date:	Time:	Lab log #			
Relinquished by: (signature)			Date:	Time:	Received by: (signature)	Date:	Time:	Laboratory Name:			

Appendix E. Data Management Plan

Personnel

Andrew Sullivan is responsible for managing this project for the TNRCC. He will be responsible for receiving the data and database review checklist from Monica Suarez of the University of Houston, reviewing the database review checklist for completeness, and conveying the data in the required format.

Dr. Hanadi Rifai is responsible for managing the project for the University of Houston. She is responsible for ensuring that data is managed by the University of Houston and its subcontractors according to this data management plan and QAPP.

Dr. Paul Jensen is responsible for managing the water quality data for PBS&J and ensuring that the data comply with this QAPP. He will submit the evaluated data to the University of Houston.

Adrienne Boer is responsible for reviewing the water quality data from University of Houston/ PBS&J and the laboratories, performing all quality control checks on the data, converting the data to the required format, archiving the data, backing up the data, and transferring the data to Andrew Sullivan of the TNRCC.

The University of Houston/North Water District Laboratory Services Laboratory Managers are responsible for ensuring that the data resulting from laboratory analyses for this project is managed according to the lab QMPs and this QAPP.

David Sullivan is responsible for receiving the project data from Andrew Sullivan, performing automated data quality diagnostic checks, and adding the data to the TNRCC database.

Systems Design – Data will be entered into, stored in, and transmitted between personal computers operating on Microsoft Windows 95/98/NT, and using common commercially-available software. QuattroPro 6.01, Microsoft Access 97, or Corel Paradox 8 will be used as databases, and data files created by these software programs will be transmitted between computers via e-mail. The TNRCC database hardware and software are described elsewhere and available from the TNRCC Data Manager.

Data Dictionary

Tag_id	A7	This field is the key between the event and results tables and is 7 characters long. The first character(s) is the prefix code for the submitting agency.
Station	A9	This is a combination of the segment_id and the sequence of a site within a segment Stationid A5 This is a unique id that identifies each sampling station. This number is generated by the TNRCC.
Enddate	A10	The date the sample was collected in the form of MM/DD/YYYY
Endtime	A5	The time the sample was collected in military format (HH:MM)
Enddepth	A6	This is the depth in meters at which the sample was collected.
Startdate	A10	This field is only required for composite samples and is the beginning date in the form of MM/DD/YYYY

Starttime	A5	This field is only required for composite samples and is the beginning time (in military format) at which the sample was collected (HH:MM)
Startdepth	A6	This field is only required for composite samples and is the depth nearest surface (in meters) at which the sample was collected.
Category	A1	This field is only required for composite samples and should correspond to the following codes: T is for time composites S is for space composites (i.e.depth) B is for both space and time composites F is for flow weighted composites
Calculatn	A1	This field is no longer used and should be left blank
Type	A2	This field is only required for composite samples and should correspond to the following codes: CN for continuous ## where ## is the number of grabs in the composite GB where the number of grabs is unknown
Comment	A135	This is a text field where record of any observational data is included with the sample
Source1	A2	The TNRCC assigned code for the submitting agency.
Source2	A2	An optional field that may be used to further identify the sample
Program	A2	A field that further identifies the sample. This field may be used to tie targeted monitoring to specific permits.
STORET code	A5	This is a five digit code which identifies the substance or measurement.
Gtlt	A1	If the value is above the detection limit then this field should contain an . If the value is below the detection limit then this field should contain an <.
Value	A8	This is the test result and should be reported in units according to the storet description

The following table outlines the codes that will be used when submitting data under this QAPP.

Name of Monitoring Entity	Source Code 1	Source Code 2	Program Code
University of Houston	U of H	UH	DL
PBS&J	PBS&J	PB	DL

Note: Source codes need to be obtained prior to submission of data.

STORET codes for data collected under this project include the following:

00094 CONDUCTIVITY (MS/CM)

00010	TEMPERATURE (DEGREE CELSIUS)
00061	FLOW (CFS)
00300	DISSOLVED OXYGEN (MG/L)
00400	pH (pH UNITS)
00530	RESIDUE, TOTAL NONFILTRABLE (MG/L)
00671	ORTHOPHOSPHOROUS (MG/L)
00680	TOTAL ORGANIC CARBON (MG/L)
01351	FLOW: 1=NO FLOW, 2=LOW, 3=NORMAL, 4=FLOOD, 5=HIGH, 6=D
31616	FECAL COLIFORM, MEMBR FILTER, M-FC BROTH (#/100 ML)
31699	E. COLI, IDEXX COLILERT (MPN/100ML)
31702	E. COLI, BOTTOM DEPOSITS (CFU/100 G)
82079	TURBIDITY (NTU)
80082	5 DAY CARBONACEOUS BIOCHEMICAL OXYGEN DEMAND (MG/L)
50060	CHLORINE, TOTAL RESIDUAL (MG/L)

Data Management Plan Implementation – Implementation of the data management plan is displayed graphically on Figure 8. Field data will be recorded on field data reporting forms, then conveyed to Monica Suarez, who will enter them into a database file. All values in the electronic file will be compared to the paper forms after entry. Field data forms will be maintained at the University of Houston for five years.

The results of TSS, CBOD₅, TOC, FC, and EC tests at the University of Houston/ North Water District Laboratory Services will be provided on paper forms, then entered into an electronic database file by Monica Suarez. After this operation, each value in the database is compared to the value on paper for accuracy.

If any calculations are made, at least 10% will be checked by hand for accuracy. Monica Suarez will convert the electronic file to Corel Paradox format for the TNRCC, and following manual accuracy checks, archive copies of each file to CD-ROM format. The Corel Paradox data file, along with a database review checklist, will be then transferred to the TNRCC Project Manager by e-mail. After approving the database review checklist, the TNRCC Project manager will convey the file to the TNRCC Data Manager. The TNRCC Data Manager will run the TNRCC automated screening procedure on the file to check for errors and outliers, then forward the results to the TNRCC Project Manager. Upon approval of the TNRCC Project Manager, the TNRCC Data Manager will add this data to the TNRCC TRACS database.

Quality Assurance/Control - See Section D of this QAPP.

Backup/Disaster Recovery – Data files stored on the network servers at the University of Houston, PBS&J, North Water District Laboratory Services, and TNRCC computer systems are routinely backed up. After a summary report is produced at the University of Houston, it will then be saved to a CD-ROM for distribution and archive at the University of Houston offices. Copies of the field data reporting forms and laboratory paper records will be maintained, at the University of Houston and the North Water District Laboratory Services, respectively, for a period of five years as additional insurance against data loss.

Archives/Data Retention - Complete original data sets are archived on permanent media (zip disk or CD-ROM) and retained on-site by the University of Houston for a retention period specified in the original QAPP approved by the TNRCC Project Manager.

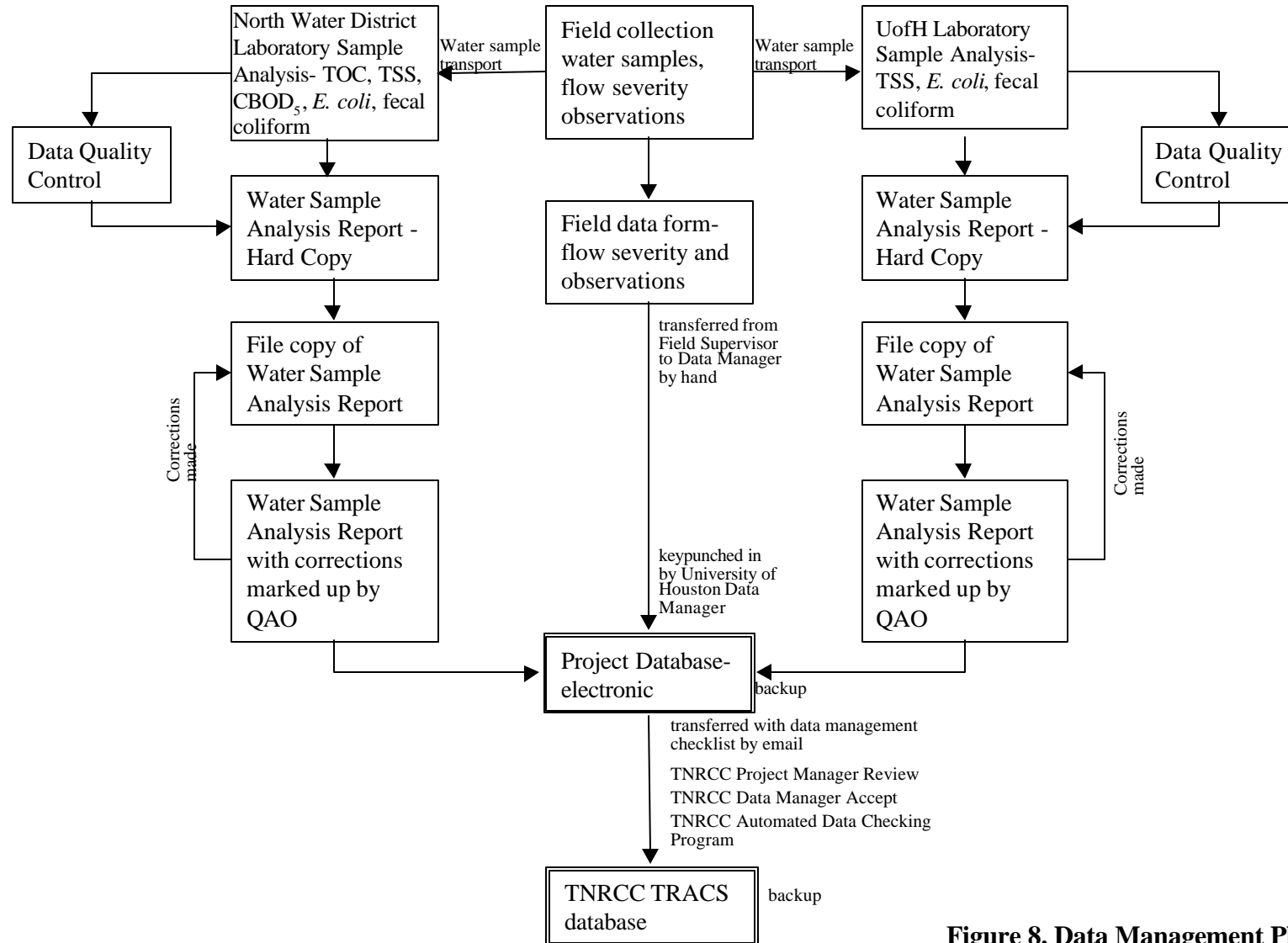


Figure 8. Data Management Plan

Appendix F. Monitoring Systems Review Checklist

This checklist is part of the QA/QC and should be used by the University of Houston/PBS&J QAO when performing monitoring systems audits in order to assure compliance with this QAPP. This checklist applies to field sampling, handling and measurement, and data management as they relate to the bacteria TMDL project.

Field Sampling

0, x, or N/A

- A. Are collection techniques consistent with SOPs and QAPP?
- B. Is field documentation complete?
- C. Were field QC samples collected for all analytes required in this QAPP?
- D. Was the chain of custody properly filled out?
- E. Were the samples properly identified? _____
- F. Were the samples properly preserved and transported? _____

Laboratory Systems

- A. Are analysis techniques consistent with SOPs and QAPP?
- B. Is laboratory documentation complete? _____
- C. Were holding times verified? _____
- D. Were the samples properly handled and stored? _____

Data Management

- A. Are field paper records properly maintained?
- B. Are laboratory logbooks properly filled out? _____
- C. Were data entered to database in required format? _____
- D. Were valid STORED codes used? _____
- E. Were digitized data compared to paper records? _____
- F. Were checks on correctness of analysis or data reasonableness performed? _____

0 = Yes x = No N/A = Not applicable

Explain any answers that may indicate a problem with the monitoring systems (attach another page if necessary):

Date Submitted to TNRCC:

Date Range:

Comments (attach README.TXT file if applicable):

QAO Signature: _____ **Date:**

Appendix G. Database Review Checklist

This checklist is part of the QA/QC and should be used by the TMDL University of Houston/PBS&J database managers and other entities handling the monitoring data in order to review data processing methods before submittal to the TNRCC. This checklist applies to data collected under a quality assurance project plan and is confined to only those items, which the data manager routinely reviews.

Field Data Review

Ö, x, or N/A

- A. QC samples (field duplicates) collected for all analytes as prescribed in the TNRCC SWQM Procedures Manual?
- D. Are field duplicate and blank results acceptable?
- E. Are field QC results attached to this review?
- D. Field documentation includes the following:
 - (1) Identification of individual(s) collecting sample(s)?
 - (2) Sample ID number and site location?
 - (3) Sample collection date, depth, and time?
 - (4) Site observations (i.e. weather, unusual flow, etc)?
 - (5) Unusual occurrences that may affect water quality?
 - (6) Sample collection problems?
- G. Chain of custody record properly filled out and available for review?

Data Format and Structure

- A. Are there any duplicate *Tag Id* numbers?
- B. Are the *Tag* prefixes correct?
- C. Are all *Tag Id* numbers 7 characters?
- D. Are TNRCC station location (SLOC) numbers assigned?
- E. Are sampling *Dates* in the correct format, DD/MM/YYYY?
- F. Is the sample *Depth* greater than 0.3 meters?
- G. Is the *Comment* field filled in where appropriate?
- H. *Source Code 1, 2* and *Program Code* used correctly?
- I. Is the sampling date in the *Results* file the same as the one in the *Events* file?
- J. Values represented by a valid parameter (*STORET*) code with the correct units?
- K. Are there any duplicate measurements for the same *Tag* and *STORET*?
- L. Are there any invalid symbols in the Greater Than/Less than (*GT/LT*) field?
- M. Are there any measurements in the *Results* file that are not in the *Events* file?
- N. Is the sampling *Time* based on the 24 hour clock (e.g. 13:04)?

Ö = Yes x = No N/A = Not applicable

DATABASE REVIEW CHECKLIST (cont'd)

Data Quality Review

Ö, x, or N/A

- A. Holding times confirmed?
- B. MALs consistent with those in the QAPP?
- C. Outliers confirmed and documented?
- D. Documentation (verified error log) provided to TNRCC?
- E. Checks on correctness of analysis or data reasonableness performed?
For FC densities that are too few or too numerous to count, are
the values reported as < or > the applicable minimum or maximum value?
- F. Have at least 10% of the data in the database been reviewed against the data sheets? _____
For FC densities that are too few or too numerous to count, are
the values reported as < or > the applicable minimum or maximum value?

Ö = Yes x = No N/A = Not applicable

Explain any answers that may indicate a problem with the data (attach another page if necessary):

Date Submitted to TNRCC:

TAG Series:

Date Range:

Data Source:

Comments (attach README.TXT file if applicable):

Data Manager Signature: _____ **Date:**

Appendix H. Example letter to document sub-tier participant adherence to the QAPP

TO: *(name)*
 (lead organization)

FROM: Hanadi Rifai
 University of Houston

RE: QAPP for *Total Maximum Daily Loads for Fecal Pathogens in Buffalo Bayou and Whiteoak Bayou*

Please sign and return this form by *(date)* to:

Civil and Environmental Engineering
4800 Calhoun Rd., Room N107D
Houston, TX 77204-4003

I acknowledge receipt of the QAPP for Fecal Pathogens in Buffalo Bayou and Whiteoak Bayou. I understand the QAPP describes quality assurance, quality control, and other technical activities that I must implement to ensure the results of work performed will satisfy stated performance criteria.

Signature

Date

APPENDIX E

SLIDES PRESENTED AT STAKEHOLDER MEETINGS

Technical Presentation at January 25, 2001 Meeting

Total Maximum Daily Load for Fecal Pathogens in Buffalo Bayou and Whiteoak Bayou

*University of Houston
PBS&J*

What is a TMDL ?

“A TMDL is the total amount of a pollutant a water body can assimilate and still meet state water quality standards.” (TNRCC, 1999)

TMDL Allocation Components

- **Identify problem**
- Identify water quality target
- **Evaluate watershed and water quality conditions**
- Assess pollutant sources (point, non-point, natural background)
- **Allocate pollutant loads**

TMDL Implementation Plan Components

- **Description of pollution control actions**
- Development of schedule for implementation of pollution control actions
- **Assurances of load allocation goal achievement**
- Determination of legal authority
- **Formulation of follow-up plan**
- Definition of measurable outcomes to evaluate plan implementation

The 303(d) List

*Water bodies identified as impaired or threatened are compiled into the **303(d) list**, named after the relevant section of the Clean Water Act (CWA). Currently, this list is developed and submitted to EPA.*

303(d) List for Relevant Water Bodies

Buffalo Bayou

Average mercury exceeds human health criterion for saltwater fish

Bacteria levels exceed contact recreation levels

~~Mean copper concentrations do not support aquatic life~~

Whiteoak Bayou

Bacteria levels exceed contact recreation levels

Mean lead concentrations do not support aquatic life

Major tasks

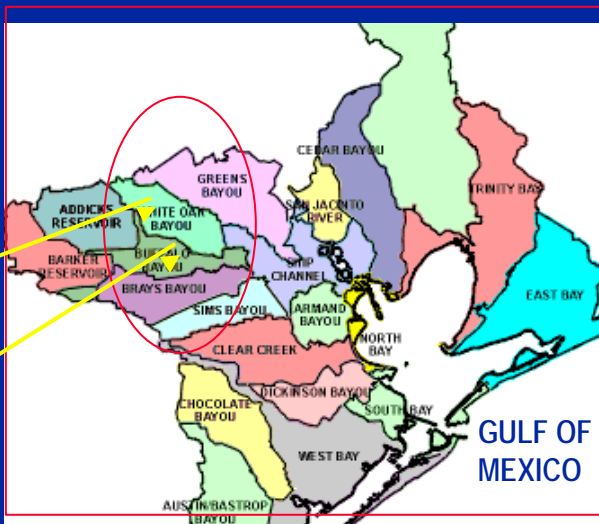
- Stakeholder/Public education and involvement
- Assess current levels and trends of bacterial indicators of fecal pathogens in the bayous
- Assess major sources, transport, and fate of bacterial indicators of fecal contamination
- Apply models to elucidate the sources and major processes controlling observed levels of FC
- Develop a QAPP for additional data collection

Buffalo and Whiteoak Bayous

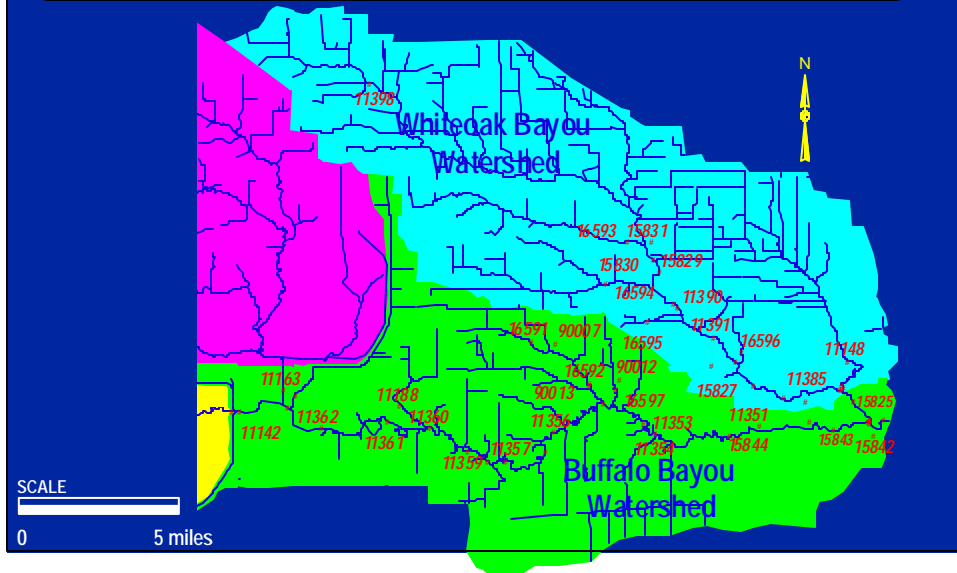


Whiteoak
Bayou

Buffalo Bayou



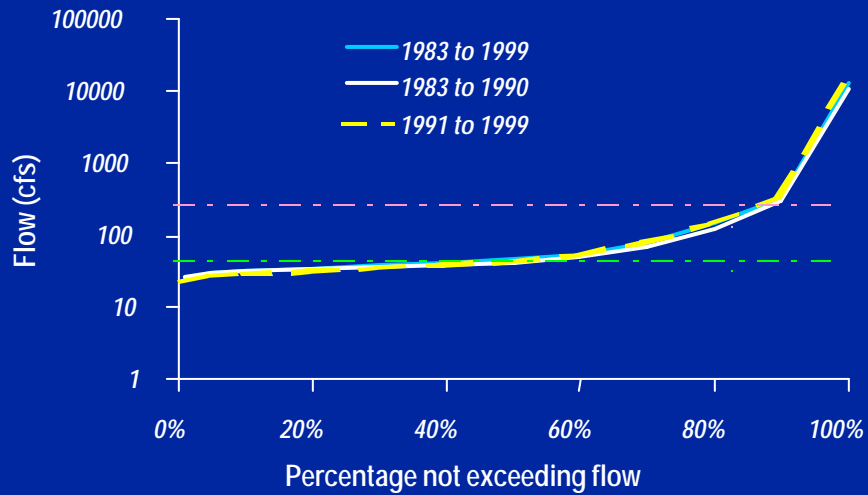
Water Quality Sampling Stations in Whiteoak and Buffalo Bayous



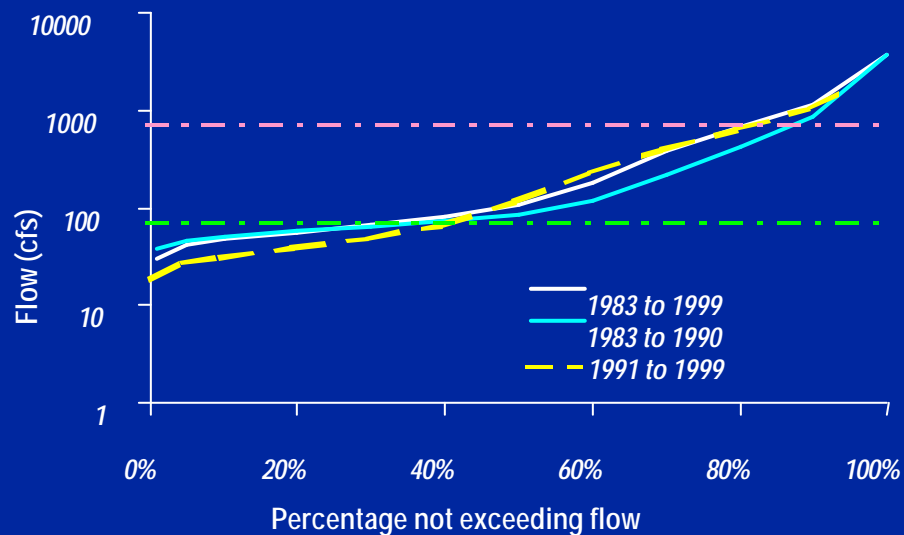
FC Data Compilation

- 1 H-GAC/San Jacinto River Basin
– TNRCC & USGS 1992-1999
- 2 H-GAC/Local monitoring data
1997-1999
- 3 TNRCC/Surface Quality
Monitoring Data 1993-1999
- 4 H&HS/ Bayou Monitoring Data
1995-1998
- 5 PW&E 1983- Jan 2000

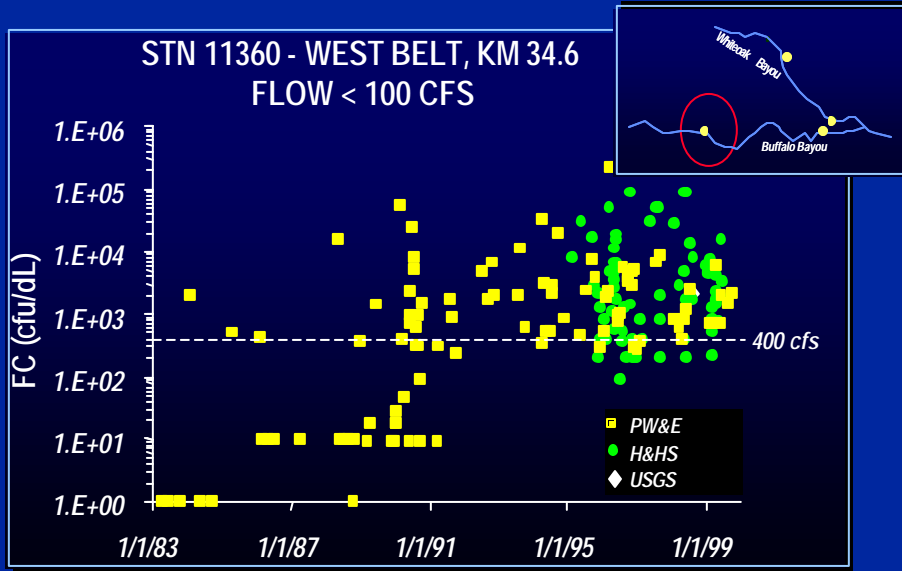
Cumulative Flow Frequency Curves for Whiteoak Bayou at Heights Blvd.



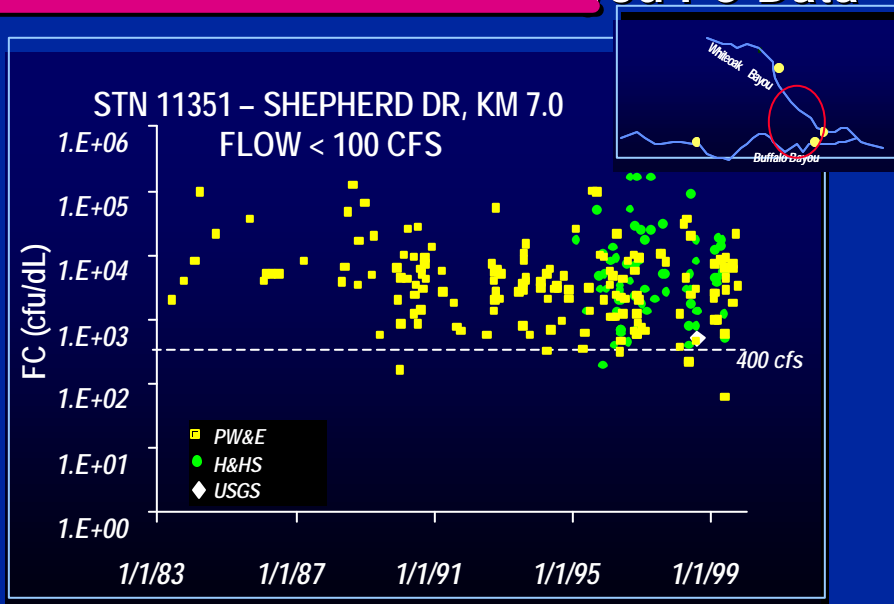
Cumulative Flow Frequency Curves for Buffalo Bayou at West Belt



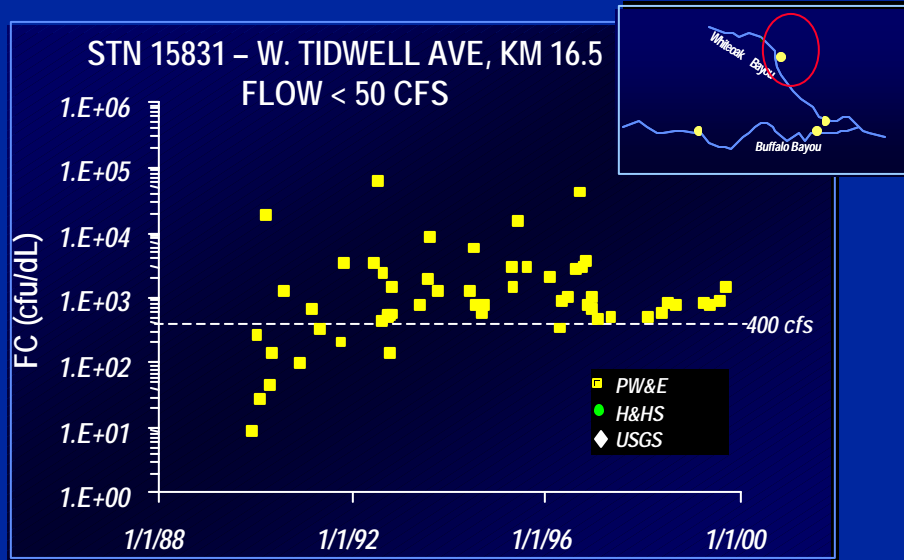
Time Series of Buffalo Bayou FC Data



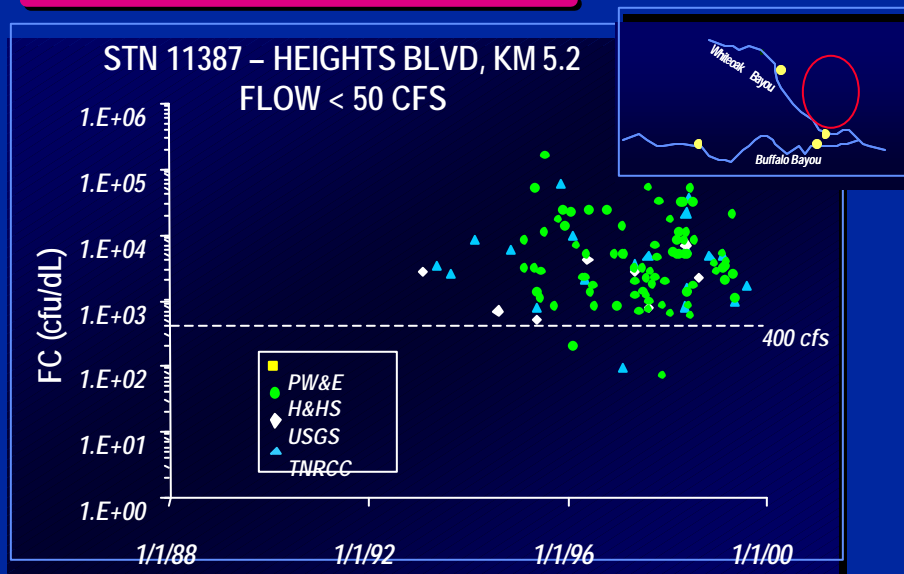
Time Series of Buffalo Bayou FC Data



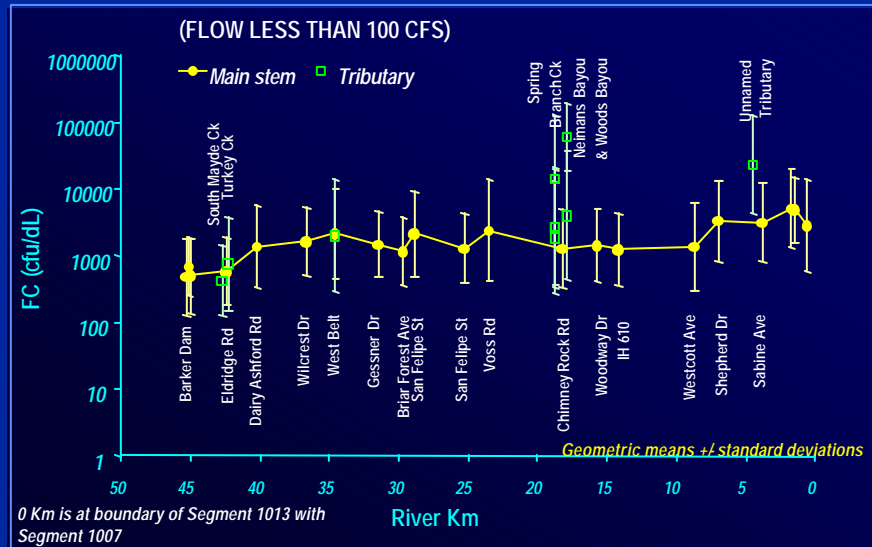
Time Series of Whiteoak Bayou FC Data



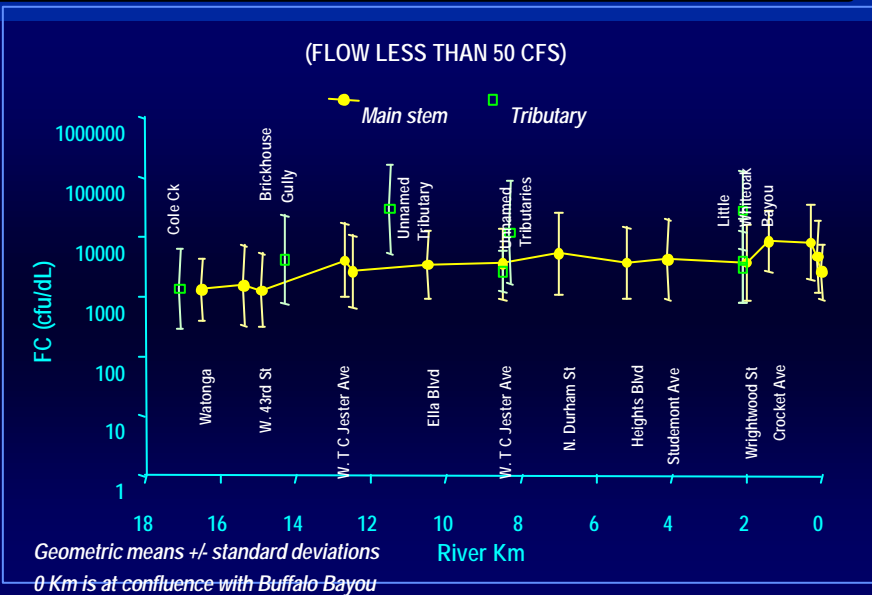
Time Series of Whiteoak Bayou FC Data



1992-1999 FC Data along Buffalo Bayou



1992-1999 FC Data along Whiteoak Bayou



1992-1999 FC Data at High-Flow

	# data	Geomean (cfu/dL)	Stdev. Log data
Buffalo Bayou (Q>1,000 cfs)			
Main stem	298	997	0.84
Tributaries	94	2,997	1.05
Whiteoak Bayou (Q>300 cfs)			
Main stem	67	9,711	0.63
Tributaries	47	36,372	0.67

Potential Sources of FC in Buffalo and Whiteoak Bayous

Treated effluent from point sources not completely disinfected

Untreated sewage from failed on-site WW systems in un-sewered areas

Regrowth or reactivation of bacteria after point source discharge

Bacteria from birds concentrated at bridges

Bacteria input from illicit discharges

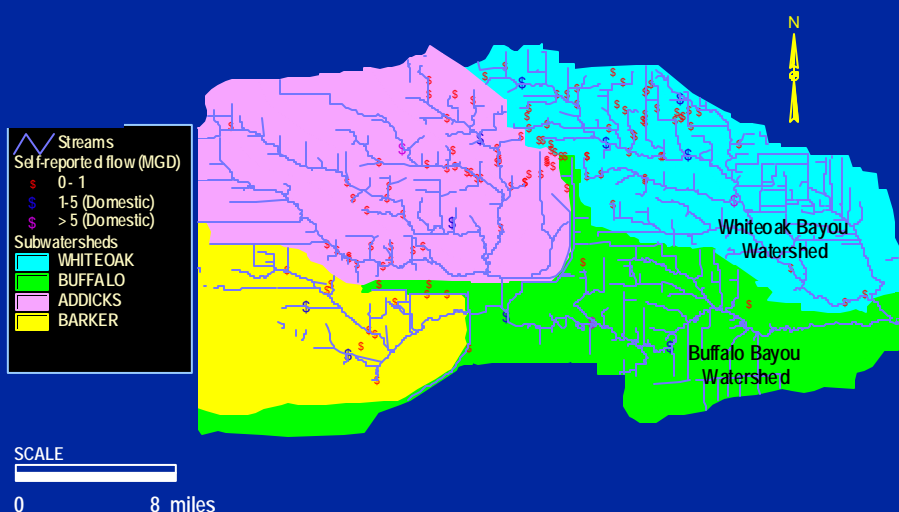
Bacteria from runoff

Discharge of untreated sewage due to sewer leaks or blockage

Bacteria associated with stream sediments

Bacteria from upstream sources

Permitted WW Dischargers to Buffalo and Whiteoak Bayous



Wastewater Discharges into Buffalo and Whiteoak Bayous

Bayou	Permitted flow (MGD)	1998-1999 self-reported average flow (MGD)
<i>Buffalo</i>	112.25	42.39
<i>Whiteoak</i>	56.67	21.62

FC Self-Reporting Data in Buffalo and Whiteoak Bayous

	Buffalo Bayou		Whiteoak Bayou	
	<u>Maximum</u>	<u>Average</u>	<u>Maximum</u>	<u>Average</u>
1998	10	7	437	22
1999	40	15	154	28
2000	2	2	211	54

Daily Maximum (cfu/dL)

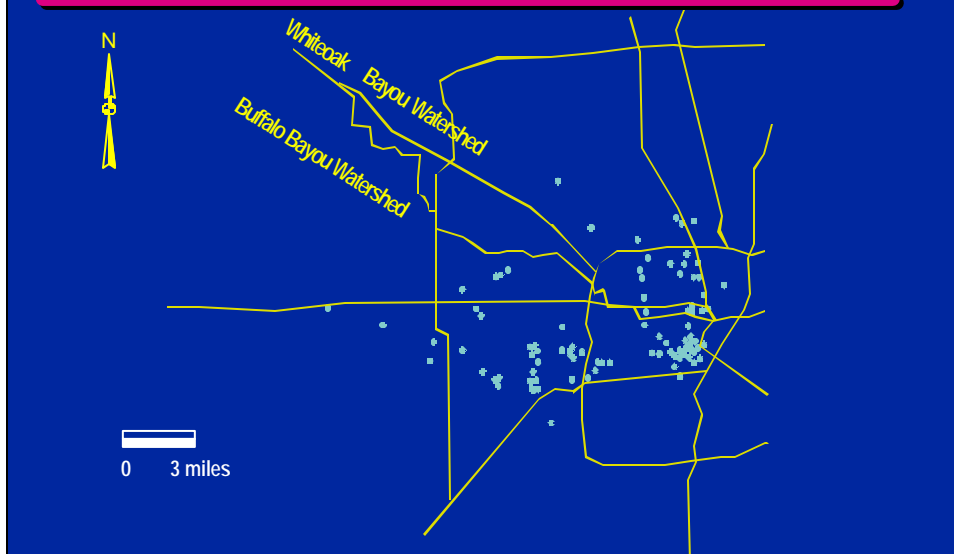
Source: EPA PCS Database

Point Source Fecal Coliform Load

Bayou	Avg. conc. minor dischargers (cfu/dL)	Avg. conc. major dischargers (cfu/dL)	Estimated PS load (cfu/yr)
Buffalo	2,114	2	3.26x10¹⁴
Whiteoak	2,114	54	2.14x10¹⁴

Major dischargers Q>1 MGD

Reported Sewer Leaks in Buffalo and Whiteoak Bayous (1989-1996)



Fecal Coliform Load from Untreated Discharges

Bayou	Volume discharges ^a (gal)	Estimated load per year ^b (cfu)
Buffalo	1,735,818	3.28×10^{13}
Whiteoak	701,435	1.33×10^{13}

^a Total volume of overflows, leaks and bypasses from PW&E database and individual permit files

^b Assuming concentration of sewage 500,000 cfu/dL

Wastewater Discharges Upstream of Monitoring Points 11398 and 11142

Bayou	Permitted flow (MGD)	1998-1999 self-reported average flow (MGD)
<i>Buffalo</i>	26.03	7.64
<i>Whiteoak</i>	7.14	3.18

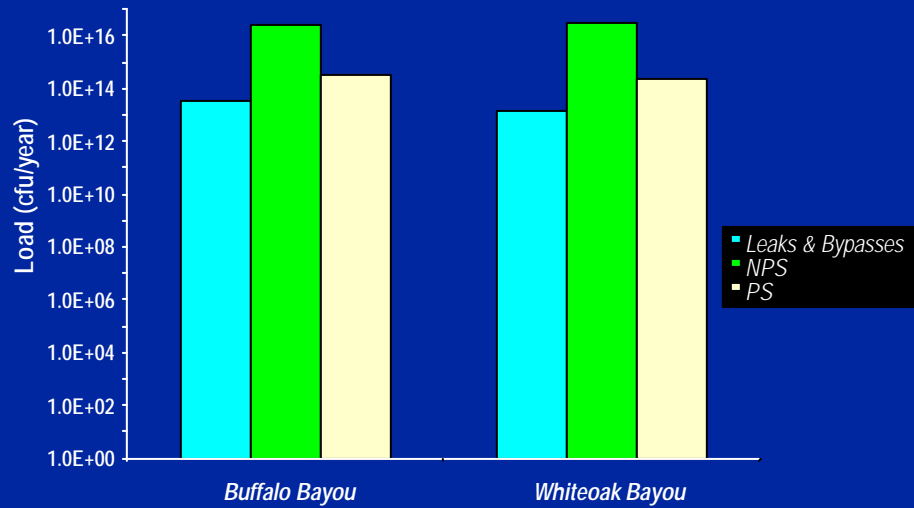


Non-Point Source Fecal Coliform Load

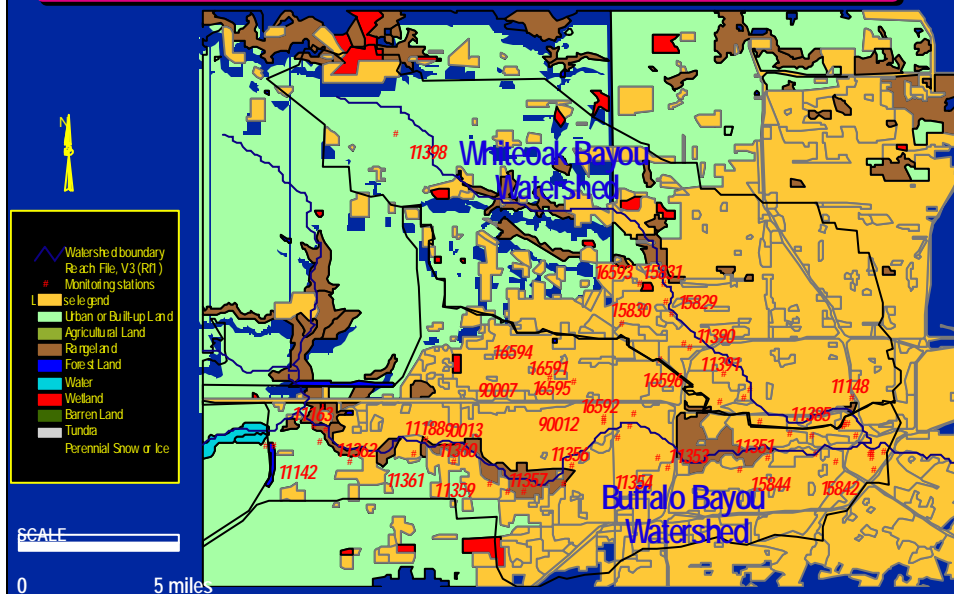
Bayou	Average concentration (cfu/dL)	Estimated NPS load per year ($\times 10^{15}$ cfu)
<i>Buffalo</i>	19,178	27
<i>Whiteoak</i>	18,332	29

Source: Newell *et al.*, 1992 (GBNEP-15)

Contribution to FC Load by Source Type



Land Use Distribution



Summary of Findings

- Nine potential sources
- Runoff dominates in wet weather and contributes during smaller rains
- Point sources dominate dry weather flow with disinfection uncertain
- Sewer leaks exist but flow is small
- More data and modeling needed for quantitative understanding

Future Monitoring Efforts

- Point Sources-AM & PM sampling
- Stormsewers-Check for dry weather flow and sample
- Smaller runoff events
- Bacteria dynamics
 - rates of change day-night
 - effects of sediment and organic levels
 - regrowth tests

Key Points and Issues

- Complexity--Bacteria levels are affected by several sources and processes; a model is required to analyze
- Model and data should develop together
- Water Quality Target needs to be addressed--levels in runoff far too high for contact recreation so what flow level is appropriate target?

Technical Presentation at March 8, 2001 Meeting

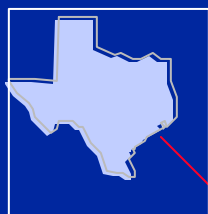
Total Maximum Daily Load for Fecal Pathogens in Buffalo Bayou and Whiteoak Bayou

*University of Houston
PBS&J*

Maior tasks

- Stakeholder/Public education and involvement
- Assess current levels and trends of bacterial indicators of fecal pathogens in the bayous
- Assess major sources, transport, and fate of bacterial indicators of fecal contamination
- Apply models to elucidate the sources and major processes controlling observed levels of FC
- Develop a QAPP for additional data collection

Buffalo and Whiteoak Bayous

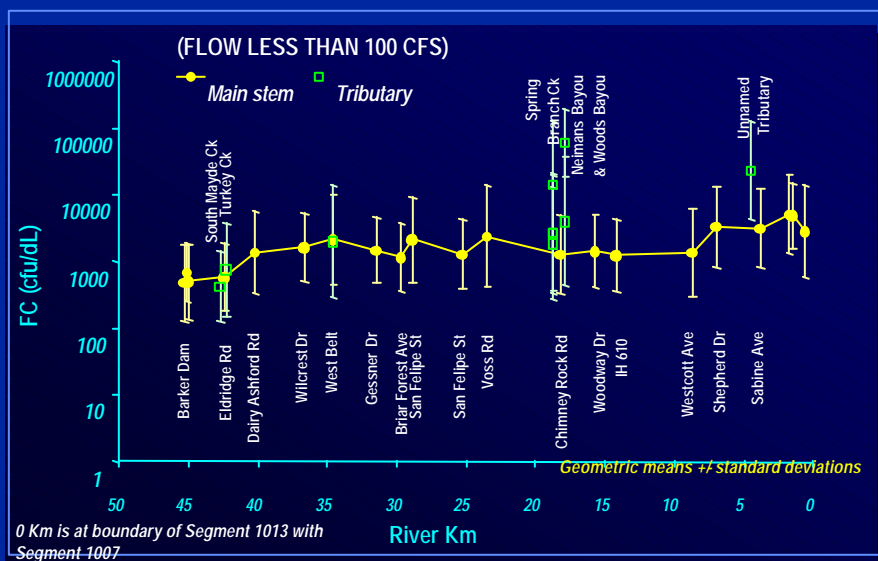


Whiteoak Bayou

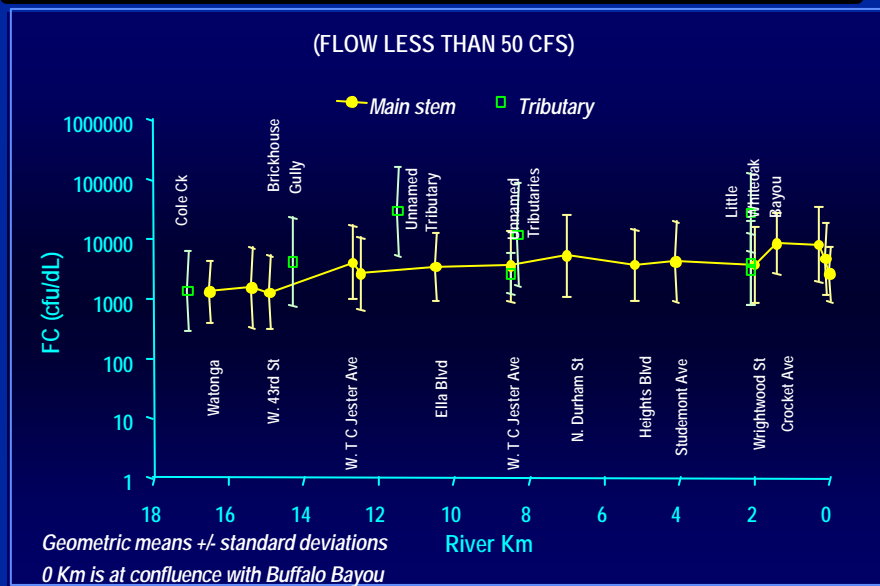
Buffalo Bayou



1992-1999 FC Data along Buffalo Bayou



1992-1999 FC Data along Whiteoak Bayou



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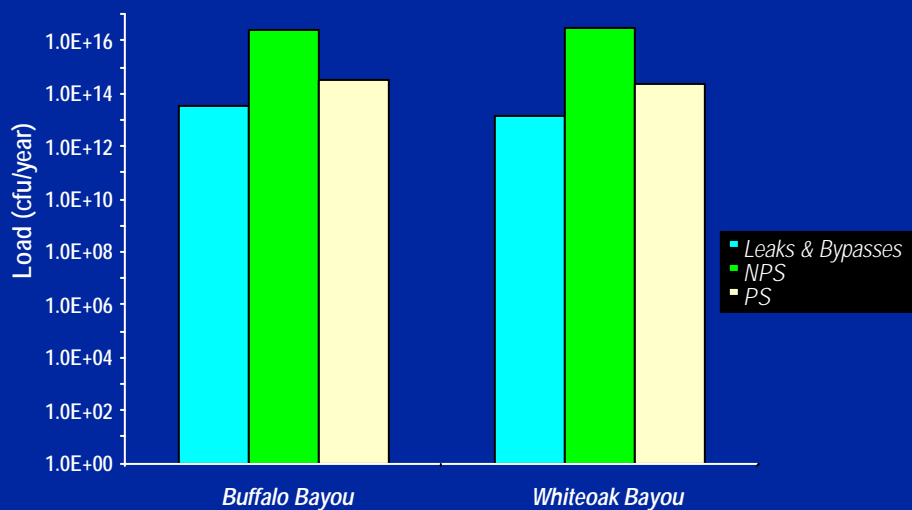
Bacteria from runoff

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Bacteria from upstream sources

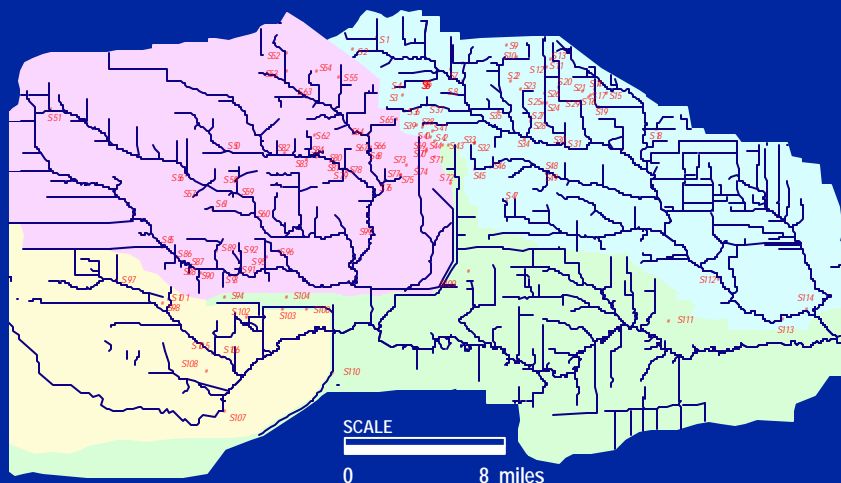
Contribution to FC Load by Source Type



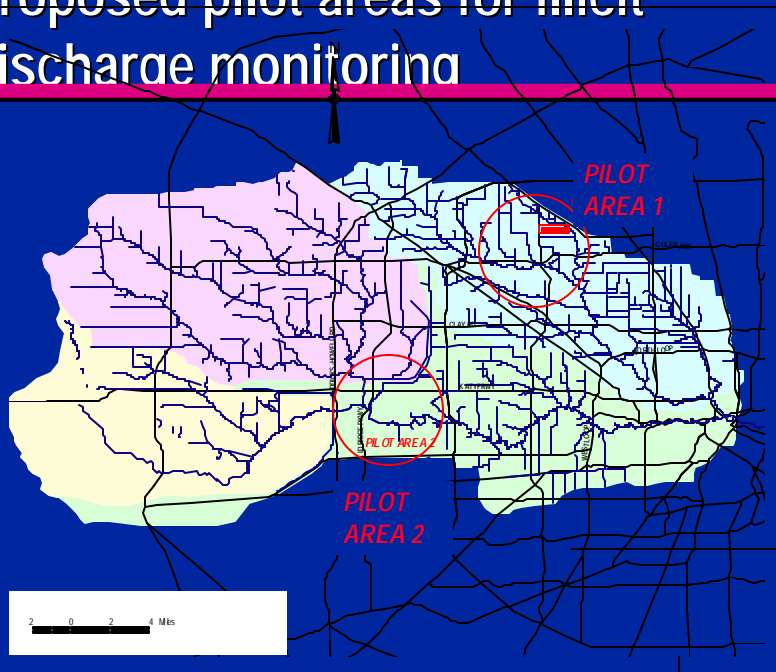
Proposed Monitoring Plan

- 1 Point source monitoring
- 2 Illicit discharge monitoring
- 3 Runoff sampling
- 4 Dynamics in the bayous

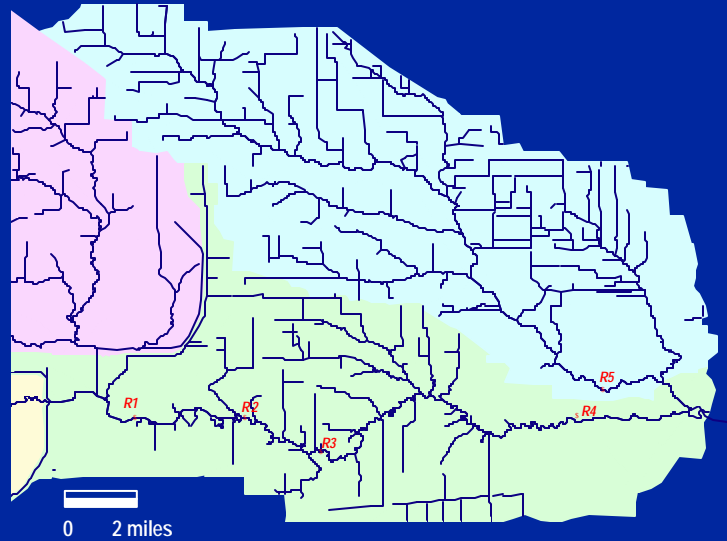
Point source monitoring locations



Proposed pilot areas for illicit discharge monitoring



Runoff event monitoring



Concentration dynamics in the Bayous

- Regrowth
- Rates of change
- Resupply from stream sediments

Modeling task

HSPF selected because it models:

- Build-up and washoff of water quality constituents in the watershed.
- Quality routing by means of advection and mixing
- In-stream first-order decay (and regrowth)
- Scour and deposition of sediments

Model data needs

- precipitation and meteorological data
- watershed land use/land cover characteristics
- hydrography and channel characterization
- quality data

Modeling activities

- 1** Delineation of subwatersheds
- 2** Data preparation and compilation
- 3** Modeling calibration
- 4** Sensitivity analysis
- 5** Model runs ® load allocations

Subwatershed definition for modeling

